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In the stomach the aerobic conditions and acid reaction would prevent the growth of *B. welchii* and the formation of toxin and, clinically, pyloric obstruction gives rise to no acute toxæmia.

Again, in the large intestine, the medium becomes rapidly acid, so that *B. welchii* would be outgrown by other organisms and its toxin destroyed. Actually, though there may be considerable growth of *B. welchii* in the cæcum, in the fæces it is frequently impossible to obtain *B. welchii* on culture. Here, also, clinically, it is a matter of common observation that constipation or obstruction of the large intestine causes no acute toxæmia until stagnation extends back into the small bowel. On this hypothesis, therefore, there should be a great proliferation of *B. welchii* in the small intestine of patients suffering from acute intestinal obstruction. As time goes on these organisms would be found higher and higher up the small intestine and eventually in the vomit.

The investigation was begun by examining the vomit and small intestine contents of cases of acute obstruction and peritonitis for evidence of proliferation of *B. welchii*. Films were made in a standardised manner, which gave a rough idea of the numbers of *B. welchii* present. It is not possible to enumerate individual anaerobic organisms on morphological appearances alone with certainty, so no attempt has been made to count them. Final identification of *B. welchii* depended upon cultural reactions and the results of mouse inoculation, using pure protective antisera for control. The results were as follows: In 20 specimens of vomit obtained from cases of peritonitis *B. welchii* were present in large numbers in 19. In 12 specimens of vomit obtained from cases of acute obstruction *B welchii* were present in large numbers in 11. In six specimens of small intestine contents examined *B. welchii* were present in enormous numbers in each specimen. Some of the film preparations of vomit showed very large numbers of organisms morphologically resembling *B. welchii*, but in other films they were not so numerous. This did not appear to bear any relation to the gravity of the case, and probably depends upon dilution of the intestinal material in the stomach.

As controls, 12 test-meals and vomit from two cases of pyloric obstruction were examined in the same way. No organisms resembling *B. welchii* were seen on films, but once *B. welchii* was obtained on culture. I only obtained one specimen of normal small bowel contents and a film, made from the lower end of the ileum, showed a few organisms resembling *B. welchii*—but they had to be looked for. *B. welchii* were grown from this specimen on culture and also from higher up the intestine. This agrees with the results of other workers,[2] that *B. welchii* are found, but are not abundant, in the small intestine.

TESTS FOR TOXIN.

From these observations it appears that there is a great proliferation of *B. welchii* in the small intestine in cases of acute obstruction and of late peritonitis. Proliferation of *B. welchii* does not, however, necessarily imply that toxin formation takes place. The organism may be abundant in the large intestine without any clinical toxæmia, and in vitro active growth may take place without the formation of demonstrable toxin. It would therefore be necessary to demonstrate the presence of the toxin in the contents of the small intestine from cases of acute obstruction or of peritonitis.

The technical difficulties of demonstrating a toxin as delicate as *B. welchii* toxin in material such as intestinal contents are very great. The toxin is apt to be destroyed in the process of rendering the material bacteria-free. The only method which I found practicable was Berkefeld filtration in an ice-chest, in an atmosphere of hydrogen. The bacteria-free fluid was then inoculated into mice intramuscularly, using antitoxic sera as controls.

Attempts to demonstrate Welchii toxin in vomit were unsuccessful, except in one doubtful case, but the acid reaction in the stomach would account for destruction of any toxin which might be present.

With the small intestine contents experiments were more successful. Material obtained from human cases of obstruction or peritonitis, and from dogs in which these conditions had been produced experimentally, was examined and the results are represented in Table I.

TABLE I.

Source of intestinal contents.	Duration.	Unprotected mice.		Protected mice.	
		Total.	Died.	Total.	Died.
Peritonitis.					
Human case	7 days	10	5	5	0
Dog 1	83 hrs.	4	4	2	0
,, 2	65 hrs.	6	6	2	0
,, 3	78 hrs.	6	4	4	0
Obstruction.					
Human Case 1	3 days	12	2	6	0
,, 2	4 days	10	2	10	0
Dog 1	56 hrs.	8	7	4	0
,, 2	51 hrs.	8	0	4	0
Totals		64	30	37	0

This experiment is definite evidence of the presence of toxin, but gives no indication of the original amount present. A large proportion would be lost during filtration, besides the probability that destruction and absorption of toxin are taking place continuously during life.

Material obtained from the large bowel from three cases of acute obstruction of the large intestine was also examined. This material was acid in reaction and, though there were apparently large numbers of *B. welchii* present, no toxin could be found. In all, 66 mice were injected with the filtrate from this source without ill-effects. This is in accordance with the absence of clinical toxæmia in cases of obstruction, when stagnation is confined to the large intestine. The contents of the normal small intestine were examined in one case and found to be non-toxic.

Thus there is evidence of enormous proliferation of *B. welchii* and of the actual presence of the exotoxin of *B. welchii* in small intestine contents of cases of acute obstruction. It is of course possible, but unlikely, that the toxin, though present, might not be absorbed. At the same time *B. welchii* toxin was the only toxin lethal to mice of which any evidence could be found, and it is reasonable to assume that this is the toxin responsible for the clinical appearance of these cases, which is so similar to that of cases of gas-gangrene. In addition to this, *B. welchii* toxin usually contains a very powerful hæmolysin, and anæmia and slight general icterus are well-known features of cases which have survived for some time. Staining of the intima of the heart and great vessels as a result of intravascular hæmolysis is a well known finding in fatal cases of peritonitis. Intimal staining is also not uncommon in fatal cases of acute intestinal obstruction; I have found it present in 9 out of 14 human cases and it was sometimes very marked.

This hæmolytic staining is usually attributed to the presence of hæmolytic streptococci, though there may be no other evidence of their presence. Had a streptococcal septicæmia been responsible, one would expect metastatic foci, and changes in the spleen, which were not present in these cases. Of the five dogs in which obstruction or peritonitis had been produced experimentally hæmolytic staining was found in four cases, and in these dogs blood cultures, taken within a few hours of death, were negative in three cases. In the fourth a variety of organisms were grown, probably a contamination. I think therefore that in the absence of evidence of other known hæmolytic organisms, the presence of intravascular hæmolysis in cases where *B. welchii* toxin has been demonstrated in the intestinal contents is very strongly evidence of the absorption of *B. welchii* toxin.

The general histological changes produced by *B. welchii* toxin are not very characteristic. Kettle has found fine fatty degeneration in the liver and heart muscle, and I have found such changes in cases of acute obstruction and peritonitis. These appearances are in no way diagnostic of *B. welchii* toxæmia, but the fatty degeneration of the cardiac muscle has a clinical importance which will be referred to later.

THERAPEUTIC TEST.

In acute obstruction the only obvious source of toxin is the contents of the obstructed intestine. In peritonitis, on the other hand, the infection in the peritoneal cavity may well give rise to considerable toxæmia, though it is only in those cases which develop "paralytic ileus" that the mortality is high and the characteristic toxæmia develops. It has, however, been suggested, as long ago as 1897 by Veillon and Zuber,[3] that in acute appendicitis it was *B. welchii* which was responsible for the infection of the appendix, the peritonitis, and the consequent toxæmia. This depended upon the finding of *B. welchii* in a large proportion of acutely inflamed appendices. This observation has been confirmed and emphasised more recently by Weinberg,[4] and anti-gas-gangrene serum has been used in France for some years in severe cases of appendix peritonitis. The results were summarised by D. G. Michel[5] in 1923, and a great improvement in mortality has been claimed. On the other hand, in this country many observers agree that *B. welchii* is only found in the immediate vicinity of a perforated appendix, and its presence results from contamination by bowel contents and is not usually the cause of either appendicitis or peritonitis. Moreover, the characteristic toxæmia will develop when there is paralytic ileus, whatever the cause of the peritonitis, whether streptococcal, pneumococcal, or resulting from any other organism, when *B. welchii* is not present in the peritoneal infection. Obviously the presence of a few *B. welchii* in the peritoneal infection cannot account for the whole toxæmia, though it may contribute a quota when present. It is the intestinal contents which must be the greatest and most constant source of toxin. At the same time, the successful use of anti-gas-gangrene serum containing *B. welchii* antitoxin by the French surgeons corroborates the hypothesis put forward in this investigation, that the intestinal toxæmia resulting from stagnation of the small intestine contents is due to *B. welchii*.

I have at St. Thomas's Hospital been trying the effects of *B. welchii* antitoxin in cases of acute obstruction and of peritonitis with paralytic ileus for the last two and a half years. With cases of peritonitis resulting from gastric or duodenal perforation, pneumococcal infection, or so-called primary streptococcal infections, the numbers were very small, and it is not possible to make any useful statistical comparison of the results of the use of antitoxin.

For statistical comparison, cases of peritonitis resulting from acute appendicitis were selected, because: (1) a reasonably large number is available annually; (2) the mortality of the disease is very constant; (3) it is usually cases which develop paralytic ileus which are fatal, and the progress of the disease can be easily followed.

Under modern conditions, thanks to the work of the pioneers in early operative treatment of cases of acute appendicitis, the majority of cases recover

without ever developing serious intestinal paralysis, and in consequence no severe anaerobic toxæmia. It was therefore decided only to administer *B. welchii* antitoxin to those cases in which one could say the chances of survival were 50 per cent. or worse. This included: (1) moribund cases of severe "general peritonitis"; (2) streptococcal peritonitis, unlocalised, in children under 12 years old; (3) cases which, after appendicectomy, continued to show signs of advance of the disease by rising pulse-rate, abdominal distension, and toxæmia.

To increase the numbers, Mr. P. H. Mitchiner (assistant surgeon), Mr. A. C. Halliwell (resident assistant surgeon), and Mr. C. V. Patrick (surgical registrar) consented to administer antitoxin to suitable cases operated upon by themselves. The series consisted of 256 consecutive and unselected cases. Eighteen of the most severe cases, including ten children under 12 years old, were treated with *B. welchii* antitoxin. There were three deaths in the series. One death was due to cardiac failure in a woman of 68, 31 days after operation, when the abdominal condition was completely recovered. One death was thought to be due to pulmonary thrombosis or embolism. No post-mortem was obtained. One must be regarded as a failure, the patient dying with paralytic ileus in spite of the administration of *B. welchii* antitoxin (Table II.).

TABLE II.

Surgeon.	Period.	Total.	Deaths.
A. C. H.	12 months	91	2
B. W. W.	23 months	82	0
C. V. P.	11 months	34	1
P. H. M.	11 months	21	0
Not operated on in acute stage	.. ..	28	0
Total	.. ..	256	3

Test series mortality .. .. 1·17 per cent. (256 cases).
Normal mortality, 1925 .. 6·3 per cent. (111 cases).

This showed a considerable reduction of mortality. With the exception of the use of antitoxic serum, these cases were treated on the usual lines in vogue at St. Thomas's Hospital. Cases seen in the first 48 hours of the disease were operated upon and appendicectomy performed. Except in young children, cases seen after more than 48 hours from the onset of the attack were not operated upon unless there were signs of spreading peritonitis or of an abscess which required drainage. In young children, on account of the usual failure to localise the infection, appendicectomy was always carried out as soon as possible. Drainage, except of the abdominal wall, was not employed unless there was a definite abscess cavity, or doubt about the suture line, or if the presence of concretions in the abdomen was suspected.

In the therapeutic test of *B. welchii* antitoxin in cases of acute obstruction classification for comparative purposes is more difficult.

It is very difficult to exclude errors due to individual difference of opinion as to what constitutes acute obstruction. For comparison I have taken as the control series figures from a paper published by Mr. C. M. Page [6] giving the mortality at St. Thomas's Hospital for the years 1919 to 1923. In this series, and in the series used for the therapeutic test of *B. welchii* antitoxin, the classification was done by Mr. C. V. Patrick, surgical registrar to the hospital. Cases of obstruction due to malignant disease, though arising primarily in the large bowel, are included when there were acute symptoms, for the reason suggested before, that the acute symptoms and toxæmia are an indication that stagnation had extended back into the small intestine. Idiopathic intussusception in infants is excluded, because manifestations of acute obstruction do not usually develop. Mesenteric thrombosis is excluded, because it cannot be relieved surgically.

The selection of cases for the administration of antitoxin is also difficult, because it is impossible to predict how any individual case will behave. On two occasions a case which appeared perfectly fit before operation took a sudden turn for the bad after relief of the obstruction and died before antitoxin could be administered. Excluding these two cases, the test series consists of 54 consecutive cases, as shown in Table III.

TABLE III.

Cause of obstruction.	Control series.		Test series.	
	B. welchii antitoxin.			
	Not used.		Used.	
	Total.	Deaths.	Total.	Deaths.
Malignant obstruction with acute symptoms	28	11	10	1
Adhesions and bands ..	24	4	10	1
Internal strangulation ..	23	9	2	1
Intussusception with tumour	3	2	2	0
Volvulus—				
Small intestine	3	2	1	1
Large intestine	1	1	2	0
Inguinal hernia	44	6	11	0
Femoral "	66	11	13	1
Umbilical "	22	7	3	0
Totals	214	53	54	5
Mortality	24·8%		9·3%	

Of these 54 cases, 19 of the most severe were treated with *B. welchii* antitoxin. In other respects all cases were treated on the usual surgical lines. Of the five deaths, one was due to streptococcal septicæmia from a prick, nothing to do with his obstruction; one was due to post-operative gangrene of gut; three were extreme cases and failed to react.

In cases of acute obstruction of the type discussed, the mortality is normally so high, between 20 and 30 per cent., that the use of antitoxic serum would always be justifiable. Further, it is not uncommon to see cases which, after most successful operative relief, suddenly collapse unexpectedly. This may be due to the sudden flooding of the circulation with a lethal dose of toxin by the very act of relief of the strangulated intestine. This might occur through the restoration of the circulation to the damaged area permitting very rapid absorption of toxin, or possibly by rapid absorption of toxin by the normal mucous membrane distal to the obstruction after its relief. The only way to control this danger would be prophylactic administration of antitoxin intravenously before operation, if necessary on the table. This was not done in the series I have reported, but I have come to the conclusion that, in cases of acute obstruction, prophylactic administration of the *B. welchii* antitoxin should always be employed when there are signs of involvement of the small intestine.

IMPRESSIONS AS REGARDS THERAPEUTIC VALUE OF *B. welchii* ANTITOXIN IN OBSTRUCTION AND IN PERITONITIS.

In cases of appendix peritonitis which showed the characteristic toxæmia associated with "ileus," the effect of *B. welchii* antitoxin was often very striking. Restlessness was greatly diminished or abolished, and the look of acute consciousness disappeared, so that patients slept easily; cyanosis, when present, disappeared; and in one case a definite icteric tinge faded rapidly. The pulse-rate usually began to fall after the administration of serum, and the quality of the pulse improved. Abdominal distension often disappeared within a few hours of the administration of antitoxin and the patient, after complaining of "wind," began to evacuate the bowels spontaneously. Even in severe cases the bowels usually began to act spontaneously, in spite of previous failure of enemata and pituitary, though distension might not completely subside until convalescence was well established.

In cases of acute obstruction similar effects were observed, but improvement usually follows so rapidly

on successful operative relief that it is only by regarding the series as a whole that the effect of the antitoxin can be assessed.

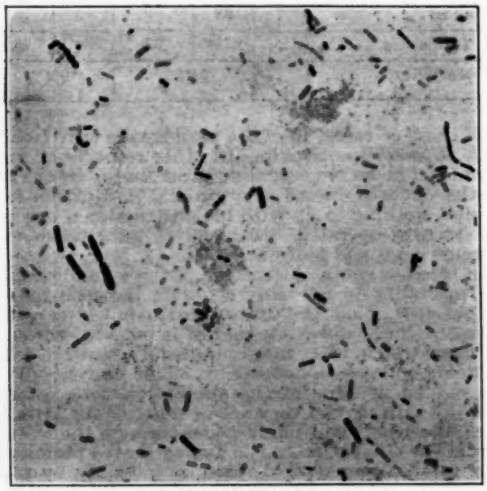
As regards the actual mortality-rates, each series appears to show a very definite improvement. The series, however, are not sufficiently large for very positive deductions. In diseases of this severity there must inevitably be a certain number of deaths, however perfect the treatment employed, and I think the figures obtained are surprisingly, and perhaps deceptively, good.

I have not made any control series with the use of normal horse serum, on the assumption that this has been adequately tested in the *B. coli communis* serum, which is seldom used now.

DOSAGE AND INDICATIONS FOR TREATMENT.

It is not suggested that the use of *B. welchii* antitoxin is in any way alternative to the recognised surgical treatment of intestinal obstruction and of peritonitis. It is put forward as a means of combating toxæmia consequent upon stagnation of the contents

FIG. 1.



Standard film of vomit from a case of peritonitis.

of the small intestine, which cannot otherwise be dealt with successfully. In cases of peritonitis, intestinal paralysis and consequent stagnation as a rule develop gradually, and it is not difficult to select those cases in which the administration of antitoxin is justifiable.

In view of these considerations, it is suggested that *B. welchii* antitoxin should be given to all cases of peritonitis which shows signs of intestinal paralysis and toxæmia, as manifested by severe or progressive abdominal distension, increasing pulse-rate, restlessness, repeated vomiting, particularly if brown or offensive, especially if these signs continue after surgical treatment has been carried out. Fatty degeneration of the cardiac muscle has been shown to occur, and it is essential that this should not progress too far to be recoverable.

The effect of antitoxic serum is to neutralise toxin after its absorption from the intestine. It is important, therefore, to realise, particularly in paralytic obstruction due to peritonitis, when the peritonitis which is the cause of the paralysis is still operative, that a clinical improvement is not an indication for stopping the administration of serum. An adequate supply of antitoxin must be continued until the small bowel is emptying itself regularly and effectively. By this means a patient may be given time to overcome the peritoneal suppuration, and the peritoneum has extraordinary powers of recovery.

In the therapeutic use of antisera it is essential that large doses should be employed. The disadvantages such as sensitisation are not for practical purposes increased by the size of the dose, and young children require as much as adults.

Many people still appear to regard the use of horse serum in human patients as a very dangerous procedure. This it certainly is not. An enormous number of patients every year are now given horse serum, both in this country and abroad for other diseases, such as diphtheria, tetanus and, now, scarlet fever, and fatalities from the serum must be so rare as to be negligible. The dangers of administering serum cannot be compared with the dangers of a condition like acute obstruction or peritonitis with ileus. Anaphylaxis is a phenomenon found in guinea-pigs and mice and is excessively rare in human beings. Further, as an extra precaution, an intradermic test can always be made and if necessary desensitisation can be quite easily and rapidly carried out. Serum rashes occurred in a few of the patients of this series, but was never the cause of any anxiety.

The serum used was anti-gas-gangrene serum, prepared by Burroughs, Wellcome and Co., Series G155, for therapeutic use. I found no indication for the inclusion of vibrion septique antitoxin, but this was the only reliable serum available containing *B. welchii* antitoxin. It is hoped that a pure *B. welchii* antitoxin of higher titre will shortly be available. The initial dose of serum should be at east 80 c.cm. intramuscularly. In extreme cases a further 40 c.cm. should be given intravenously on the table. After the initial dose 40-80 c.cm. should be given intramuscularly daily until the bowels are evacuating spontaneously and effectively. The most difficult cases are those in which matting of the intestine occurs, producing obstruction which may be organic. The use of antitoxin must not be allowed to prejudice the question of operative relief of obstruction due to matting of the intestines, as a result of peritonitis. In cases of acute obstruction, where there is reason to suspect small bowel involvement, for the reasons already discussed, it is suggested that antitoxin should always be given prophylactically. An initial dose of 40 c.cm. should be given intravenously before operation, with a further 40 c.cm. intramuscularly. After operation further doses of 40-80 c.cm. should be given daily until the bowels are acting regularly.

I have in this series sometimes used smaller doses, but the series was experimental, and for general purposes I am convinced that the best results can only be obtained by the use of larger amounts.

DISCUSSION.

This investigation was begun on the hypothesis that the toxæmia in cases of acute intestinal obstruction, whether organic or paralytic, was due in part at least to the absorption of *B. welchii* toxin from the stagnant contents of the small intestine. It is not asserted that this is the only toxin present, but it was the only toxin of which evidence was found by the most delicate tests available. If it is true, the hypothesis offers a simple solution for many unexplained problems.

One of the most difficult and dangerous complications of acute intestinal obstruction or of peritonitis is paralysis of the intestine. Apart from the suggestions arising from this investigation, the treatment of "ileus" has always been unsatisfactory. Many procedures have been advocated, such as doses of pituitary or eserine, jejunostomy, ileostomy, and ileocolostomy, but all require for their success that the bowel should still be able to contract. If the intestine is really paralysed, pituitary and eserine fail to secure evacuation, while they put a great strain on the heart, which is already damaged by the toxæmia. Jejunostomy, ileostomy, and ileocolostomy have all the disadvantages of operative procedures carried out on patients who are already gravely ill and, if the intestine is really paralysed, will only secure evacuation of the loop into which an opening has been made. The amount of material obtained by drainage is often disappointing. Of

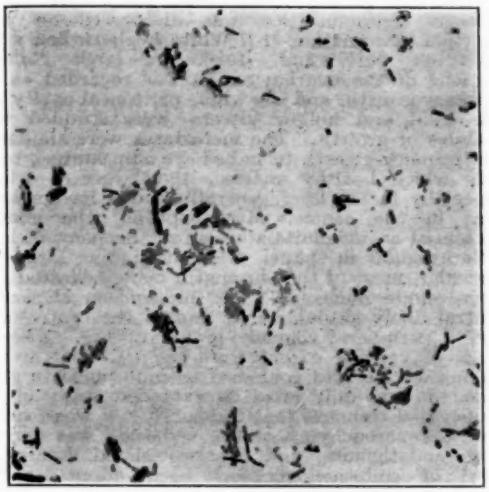
the six cases in which ileostomy or jejunostomy was performed for obstruction or peritonitis, I have only three times been able to obtain sufficient material for filtration. In these cases *B. welchii* antitoxin was being administered in large amounts.

Now the toxin of *B. welchii* has a special affinity for muscular tissue, and it may well be that this paralysis of the intestine is in part due to an absorption from the intestinal contents of *B. welchii* toxin, to which the muscle wall is exposed in its greatest concentration. Thus the administration of antitoxin, besides combating the general toxæmia, may contribute towards the recovery of the intestinal muscle, so that the toxic intestinal contents can be evacuated and absorption of toxin be brought to an end. It was observed repeatedly, during the clinical trial, that distension disappeared and the bowels began to act freely after the administration of serum. As this coincided with clinical improvement, it cannot be definitely attributed to the direct action of the antitoxin on the intestinal muscle.

The very high mortality of obstruction of the small intestine by bands and adhesions coincides with ideal conditions for the development of *B. welchii* toxin in the contents of the small intestine from the very onset of the disease. The complete absence of toxæmia in patients suffering from absolute constipation, even for weeks, or of chronic obstruction of the large intestine, coincides with the unsuitable conditions in the large intestine for the development of *B. welchii* toxin. Again, in pyloric obstruction the unsuitable acid medium explains the entire absence of toxæmia.

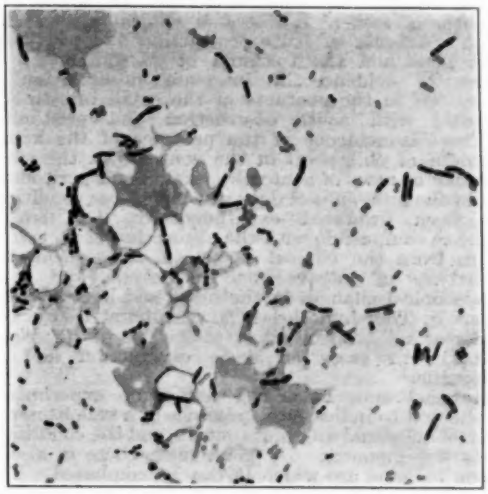
Again, the difference between patients suffering from a peritoneal infection, as contrasted with a pleural infection, even of the same organism, has always been the subject of speculation. This difference may on this hypothesis be explained on

FIG. 2.



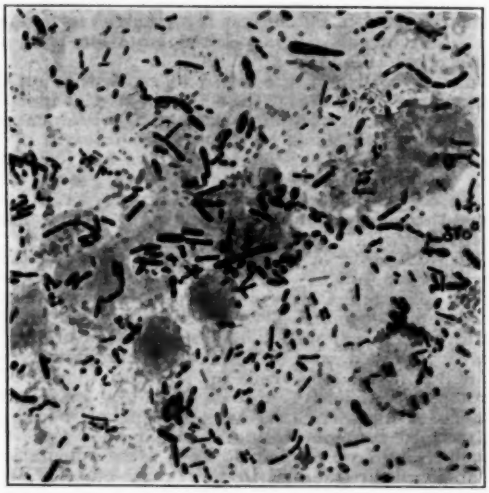
Standard film of vomit from a case of obstruction.

FIG. 3.



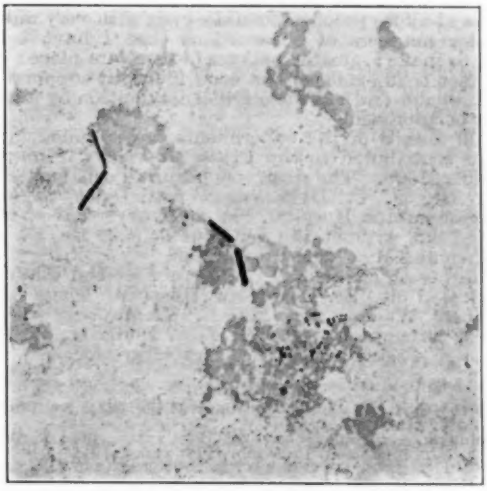
Standard film of small intestine contents from a case of peritonitis.

FIG. 4.



Standard film of small intestine contents from a case of obstruction.

FIG. 5.



Standard film of contents of normal terminal ileum. A selected field showing organisms resembling *B. welchii*.

the assumption that in peritoneal infections the clinical picture will result from the absorption of *B. welchii* toxin from the stagnant contents of paralysed small intestine. The gravity of the toxæmia will be in proportion to the extent of small intestine affected, and will be much greater in diffuse infections than in cases where there is a localised abscess. This is in complete accord with clinical experience.

CONCLUSIONS.

To recapitulate the evidence on which the hypothesis rests: 1. There is clinical resemblance of the toxæmia in acute obstruction and peritonitis with ileus and the toxæmia of gas-gangrene. 2. There is evidence of immense proliferation of *B. welchii* in the contents of the small intestine of patients with acute obstruction and peritonitis. 3. There is evidence of the presence of the actual exotoxin of *B. welchii* in the contents of the small intestine of cases of acute obstruction and peritonitis, and in the intestines of dogs in which these conditions had been produced experimentally. 4. There is evidence compatible with the absorption of *B. welchii* toxin, from the clinical aspect of cases, from the occurrence of intravascular hæmolysis, and from microscopical changes in the heart and liver of fatal cases. 5. The hypothesis is corroborated by the results of a therapeutic test of the use of *B. welchii* antitoxin in cases of acute obstruction and of peritonitis.

In conclusion, I believe that these experiments are the first to indicate the presence of a true bacterial toxin of intestinal origin, its nature, and the conditions of its development. By good luck, there is also a means to hand by which it can be combated. The hypothesis offers a simple explanation for many problems. Therapeutically, if subsequent results are as encouraging, it is important, because of the large number and high mortality of cases in which acute obstruction may occur. It has not been possible to produce absolute proof of the hypothesis as a whole. The nature of the problem and technical difficulties make absolute proof impossible, even with very much greater numbers of observations that I have been able to make; greater reliance is therefore placed on the fact that evidence has been found in support of the probable truth of the original assumption by many lines of approach.

Full details of the experiments are recorded in a paper contributed to the *British Journal of Surgery*, October, 1926. The work was begun in collaboration with Dr. S. C. Dyke, now pathologist to the Wolverhampton Hospital. It could never have been carried out without the generous help of Dr. R. A. O'Brien and Miss Muriel Robertson.

The investigation was carried out at the Clinical Surgical Unit, St. Thomas's Hospital, where Sir Cuthbert Wallace and Mr. B. C. Maybury have helped throughout, and Prof. L. S. Dudgeon, during the later stages, with advice and suggestions.

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BAKERS' DERMATITIS AND COMPENSATION.—At Southport County Court on April 7th a baker claimed compensation under the Workmen's Compensation Act from his former employers for bakers' itch contracted in the course of his employment. Although he had now recovered it was submitted that he was a derelict on account of the state of the labour market; if he resumed work as a baker the disease was likely to recur. The respondents contended that although the man was entitled to compensation, it was strictly limited. Judge Thomas said he thought the applicant should return to work as a baker and granted compensation at the rate of £1 3s. a week for 13 weeks. He also made a suspensory order allowing him to claim again if necessary.

A FILTRABLE ENDOTHELIOMA OF THE FOWL.

BY A. M. BEGG, M.B., CH.B. N.Z.

(*From the Laboratories of the Imperial Cancer Research Fund.*)

THE new growth which forms the subject of the present communication was discovered on post-mortem examination of a White Leghorn hen which died on Nov. 2nd, 1925. A large globular tumour of the ovarian region was regarded as the primary growth, and the whole peritoneal cavity and the solid and hollow viscera were studded with nodules of growth. The metastases were similar to the primary growth in naked-eye appearance, being soft white healthy masses, the larger of which, especially in the liver, generally had a hæmorrhagic area in the centre. Microscopically the nodules presented an indefinite alveolar arrangement of large cells irregular in shape. The nuclei were large and vesicular, most of the chromatin being collected in a large single nucleolus. The protoplasm showed a central finely granular area around the centrosomes and a peripheral coarsely granular zone. Necrotic areas of varying extent were frequent and around them the cells had coalesced to multinucleate giant cells. It was only after an extended study of the propagated tumours that the conclusion was reached that the parenchyma of the neoplasm was derived from endothelium, and the provisional descriptive label of endothelioma has been adopted. The histological findings are reserved for a future communication.

1. *Propagation by Cellular Grafts.*

Seven young chicks were inoculated with grafts of 0·02–0·03 gr. in the right and left pectoral muscles. On the right the grafts were taken from the large (primary) growth, on the left from a liver metastasis. The result of this primary transplantation is shown in the chart (Fig. 1).

Only one of the grafts failed to grow, that on the right side of chick No. 6, killed 49 days after inoculation. Transplantation of grafts has now been carried on for 20 generations, at an average interval of 27 days, fluctuating between 10–12 days and 55 days. Two periods of depression, with slow growth and occasional absorption of the tumours, have been passed through, and have again given place to a phase of rapid growth.

In the majority of the birds inoculated metastases have been found, most commonly in the liver and spleen. The lungs have only occasionally presented macroscopic secondaries. The kidneys, subcutaneous tissues, abdominal wall, and lymph nodes are occasionally involved, and widespread dissemination has frequently been observed in animals successfully inoculated with cell-free extracts. An interesting instance of metastasis formation occurred in a bird of the third transplantation. It had been lame for some days and was killed 55 days after inoculation. The inoculation tumours in the breast-muscles were small, but on opening the abdomen extensive metastases were found in the liver and lungs. A nodule 1·5 cm. in diameter occupied the lower pole of the left kidney and the nerves of the left leg passed through, and were pressed upon by the growth, thus accounting for the lameness observed during life. As in experiments with the Rous fowl sarcoma it is not unusual to find the association of extensive metastases with a small inoculation tumour—as in the above example, or, conversely, a large tumour at the site of transplantation and small or no metastases.

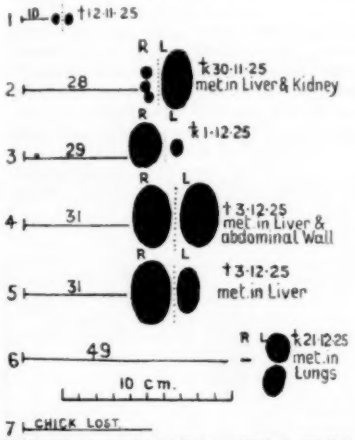
Although the original tumour occurred in a White Leghorn hen, no racial restriction has been observed in transplantation, all races of domestic fowls being equally susceptible. In this respect the present growth agrees with Rous's osteo-chondro-sarcoma

No. 7, which exhibited the same catholicity (Tytler, 1913 [1]).

2. *Propagation with Dried Material.*

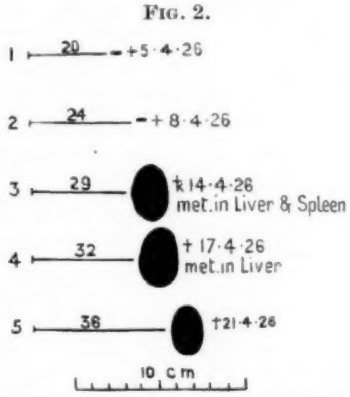
A bird with a large tumour, resulting from an inoculation of filtered incubated tumour, was killed, and the tumour removed aseptically. It was minced finely and spread in a thin layer in a Petri dish, which was placed in a desiccator with phosphorus pentoxide. The desiccator was evacuated and placed in the ice-safe. Three days later the dried scales were removed and ground in a mortar with a small amount of sterile diatomaceous earth. Normal salt solution was added and mixed to the consistence of a thick paste. A chick received 0·5 c.cm. of this paste in the pectoral

FIG. 1.



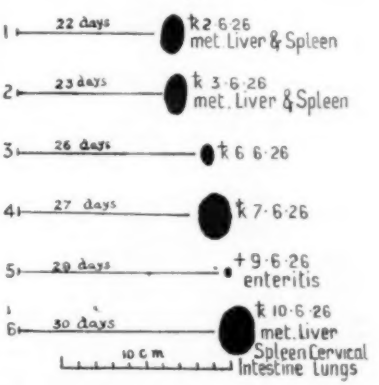
Primary transplantation (cellular grafts) of MH_2. Expt. MH2/0–1A. Seven chicks inoculated 0·02–0·03 g. grafts, r. and l. pectoral muscles [r. from primary, l. from liver]. 2/11/1925.

FIG. 2.



Transmission of MH_2 (fowl endothelioma) by filtered broth "culture," i.e., without living tumour cells. Filtrate Expt. No. 1, 15/3/1926; 5 Rhode Island chicks inoculated in right pectoral muscles 0·5 c.cm. Chamberland L 1 filtrate of a 22-hour culture to which emulsion of chick embryo had been added.

FIG. 3.


1 22 days †2 6·26 met. Liver & Spleen
2 23 days † 3·6·26 met. Liver & Spleen
3 26 days † 6 6·26
4 27 days † 7·6·26
5 29 days + 9·6·26 enteritis
6 30 days † 10·6·26 met. Liver Spleen Cervical Intestine Lungs
10 c m.

Another experiment similar to that in Fig. 2. Chick No. 6 was a Rhode Island and had very widespread metastases. Filtrate Expt. No. 2, 11/5/1926; 6 chicks inoculated in right pectoral muscle with 0·5 c.cm. Chamberland L 1 filtrate of a 23-hour culture, to which emulsion of chick embryo had been added.

muscle of the right side (28/5/26). A large tumour (5×4 cm.) resulted and the bird was killed 24 days later. Multiple miliary metastases were found in the liver and a large nodule in the spleen. A graft from the pectoral tumour was inoculated into a young bird which had to be killed 14 days later, the tumour having reached a size of 4×3 cm. Metastases were found only in the right lung.

3. *Propagation by Filtered Material.*

(*a*) *Direct filtrate.*—A fowl with a large tumour resulting from the inoculation of filtered incubated material 42 days previously was killed on 22/6/26. The tumour was removed aseptically, and 2 g. were taken and ground with sand. To this ground-up material 80 c.cm. of Locke solution was added. The fluid was clarified by filtration through sand and paper pulp, and the resulting clear fluid passed through a Chamberland L 1 filter candle. The filtrate was mixed with the minced tissues of an 11-day chick embryo and the resulting emulsion inoculated into three chicks in doses of 0·5 c.cm. Two died early. The third chick was killed 24 days later. A tumour, 5×2·5 cm., was found at the site of inoculation. Metastases were present in the liver, spleen, lungs, intestines, ureter, and cervical glands.

A similar experiment (30/6/26) in which two chicks were inoculated with 0·5 c.cm. of filtrate and embryo emulsion gave a similar result. One chick was negative, the other died 25 days after inoculation with a large tumour (5×2·5 cm.) and metastases in the spleen and cervical glands.

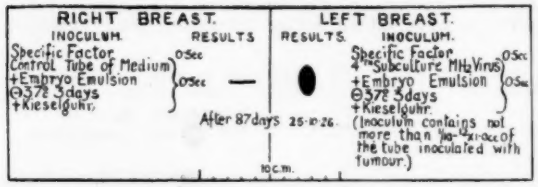
(*b*) *Filtration of broth "cultures."*—The polymorphism of the cells in the primary tumour and in several of the earlier propagated growths led us, erroneously, to regard this neoplasm as embryomatous (or at least mixed) in character, and in consequence of chick embryo and five Rhode Island chicks each received 0·5 c.cm. into the muscles of the right pectoral region. The result of the experiment is shown in Fig. 2. Three out of the five birds were successfully infected. Two repetitions of this experiment have been carried out. The result of the first of these (Filtrate Expt. No. 2) is shown in Fig. 3. (It is of interest to note that chick No. 6 of this experiment, killed 30 days after inoculation, was a Rhode Island bird, the primary tumour having occurred in a White Leghorn. This neoplasm does not show the same strict racial predilection which is so well seen in the case of Rous's No. 1 sarcoma but, like Rous's osteo-chondro-sarcoma No. 7, it grows equally well in all the races of domestic fowl which have been tested.) In the third experiment of this series (26/5/26) three chicks only were inoculated. One died six days after inoculation. The embryonic tissues inoculated with the filtrate were still proliferating freely, so that it is impossible to decide whether infection had occurred. The second was killed 19 days after inoculation. There was a large primary growth, metastases in the liver, and enlarged cervical glands. The third died 118 days after inoculation with a large pectoral tumour, and metastases in liver, spleen, œsophagus, and pancreas.

In each of these three experiments the tumour material used arose from a graft of living cells. It was of interest to determine whether the tumours so produced could themselves give an active filtrate after incubation. The tumour from bird No. 1 of Filtrate Expt. No. 2 (Fig. 3) was removed aseptically, and fragments placed in three tubes of broth. The tubes were incubated anaerobically as before. Three White Leghorn chicks were inoculated with the filtered broth from these tubes with added embryo emulsion. All three were positive, dying 16, 17, and 26 days after

inoculation. The experiment was repeated with the tumour from bird No. 6 of the same experiment (Fig. 3), except that the tumour was incubated in serum broth. Two White Leghorn chicks were inoculated as before. Both developed tumours and died 17 and 22 days respectively after inoculation.

(c) *Propagation with filtered fluid alone (no embryonic cells added).*—Three separate attempts were made to infect developing chick embryos with filtered broth

FIG. 4.

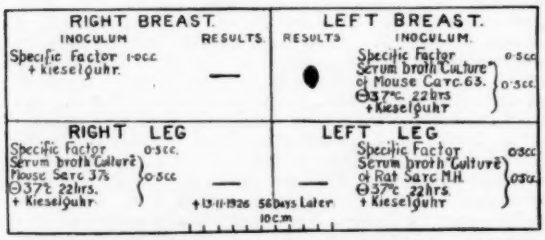


Acriflavine inactivation Expt. No. 14 (vide table). 30/7/1926. Two chicks inoculated, one died five days later. Showing inertness of filtrate from tumour incubated in acriflavine broth (1 : 3500) alone (r. breast), and restoration of activity by addition of fourth subculture of MH_2 virus (l. breast).

"culture," but all were unsuccessful. The attempt was then made to produce the tumour in young chicks with filtered broth cultures. Three chicks were inoculated (26/5/26) with 0·5 c.cm. filtered broth culture to which a small quantity of kieselguhr was added. One died after 3 days and another after 43 days and were negative. The third was killed 26 days after inoculation; it had a large tumour in the pectoral muscles (5 × 2·5 cm.) and numerous large metastases in the liver. Smaller secondary growths were found in the spleen, pancreas, and adrenal.

The experiment was repeated (3/6/26), 1 c.cm. of filtrate and kieselguhr being injected into three White Leghorn chicks. All three were positive, dying 18, 21, and 26 days respectively after inoculation. Metastases were present in the first two, but not in the bird

FIG. 5.



Acriflavine inactivation Expt. No. 15 (vide table). 18/9/1926. Attempted substitution of mammalian viruses. Two chicks inoculated, one alive and negative at all sites, 6/4/1927. Successful reactivation of acriflavine broth filtrate of MH_2 (r. breast) by "culture" of mouse carc. (l. breast) and failure with mouse and rat sarcoma "cultures" (r. and l. leg).

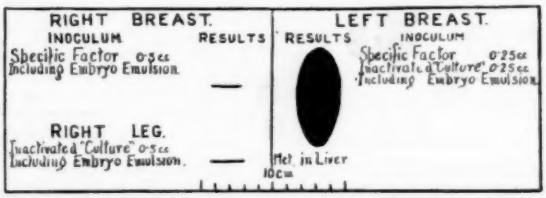
dying at 26 days, although this bore the largest tumour (5 × 3·5 cm.).

4. *Analysis of Transmission without Living Cells.*

It is clear from the foregoing experiments that this propagable endothelioma belongs to the same group of tumours of the fowl as the three Rous sarcomata, 1,[2,3] 7,[1,4] and 18,[5] Fujinimi's sarcoma,[6] and the tumours described by Teutschländer,[7] and others. At the present time opinions are divided as to the true nature of these tumours of the fowl and in particular as to their relation to the malignant neoplasms of mammals. A widely entertained opinion is that these fowl neoplasms are a peculiar group of virus infections of connective tissues, comparable with, and most closely related to, the epithelial overgrowth of fowl and pigeon-pox. Their similarity to mammalian sarcomata is on this view superficial and deceptive. Those who hold the contrary opinion that, viz., these neoplasms are true sarcomata, essentially the same ætiologically and biologically as the corresponding new growths of mammals, differ among themselves, some holding that a living infectious agent (virus) need not be postulated, pinning their faith to peculiarities of enzyme action (Carrel, Murphy [8]) and others. While many workers have affirmed a belief in the microbic causation of cancer, the only coherent statement of the virus nature of these and all other malignant new growths is that of Gye.[9] His view, based on a study of Rous sarcoma No. 1, puts the tissue and racial specificity of these conditions in the forefront of his argument. The virus he regards as relatively non-specific and common to most of the new growths, carcinomata as well as sarcomata, of birds and mammals. The tissue and racial restrictions in transmission without living cells are believed by Gye to depend on the presence of a chemical substance derived from the host, the "specific factor." This of itself, without the virus, cannot give rise to a tumour; without its concurrence the virus is innocuous.

The following experiments were undertaken to test the validity of Gye's conception on the related but distinctive material, presented by this propagable endothelioma. The technique followed is that

FIG. 6.



HCN inactivation. Exp. No. 1 HCN (vide table). 21/6/1926. Two chicks inoculated, one negative at all sites. Result after 47 days of inoculation of single factors ("specific factor" r. breast, "virus" r. leg) and combined factors (l. breast).

described by Gye (1925,[9] 1926 [10]) and throughout I have had the advantage of Gye's personal advice and criticism. The responsibility for the results and the conclusions drawn from them is mine. The experiments are being continued, and the present instalment should be regarded merely as a contribution to the controversy which has followed the publication of Gye's papers. The work is technically exacting and time-consuming, and it is not surprising that differences of fact and interpretation still exist.

Gye's original method [9] of obtaining the "specific factor" free from virus, by the action of chloroform, has failed completely with the Mill Hill endothelioma. The two alternative methods of rendering the virus inactive, leaving the "specific factor" in play, by the action of acriflavine and by hydrocyanic acid (Gye, 1926 [10]) have been more successful. Heating active fluids to 55° C. for 15 minutes gives a product which can restore the tumour-producing power of the fluid which has been rendered inert by acriflavine or hydrocyanic acid. Heat-inactivated fluids of this kind are used in the following experiments to supply the virus with two exceptions—acriflavine Expts. 14 and 15 (Figs. 4 and 5). The end-points of these inactivations are not sharp, and it is only by the result of the animal experiment that it can be inferred that the active substances have been reduced below the threshold concentrations. When the additional difficulties introduced by variations in tumour virulence and individual susceptibility of the chicks are borne in mind, it is not surprising that completely convincing demonstration of the dual nature of non-cellular transmission has not yet been achieved, but the results so far obtained are in harmony with this view.

The accompanying table gives the results of all the experiments which have been undertaken to analyse

the mechanism of non-cellular transmission of this tumour.

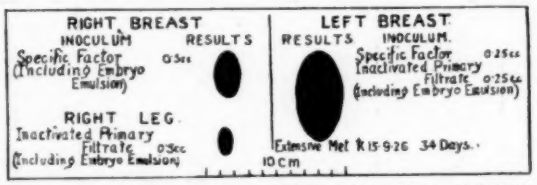
Summary of All Analysis Experiments.

	Experiment.	Control (single factor).	Experiment (both factors).	
	Chicks.			
A	1. 14.	+ − − − (one died early)	+ + + + + + + + − −	
A	2. 9.	+ − − − − −	− −	
A	3. 6.	+ −	+ + + +	
A	4. 6.	− − − −	− −	
A	5. 3.	+ + +	+ + +	
B	1–12 28	All negative.	All negative.	
B	13 4	− − (both died early)	+ −	
B	14 2	− −	+ −	Fig. 4.
B	15. 2	− −	+ −	Fig. 5.
B	16. 2.	+ −	− −	
C	1. 2.	− −	+ −	Fig. 6.
C	2. 2.	+ −	+ −	Fig. 7.
C	3. 2.	Scar.	+ +	Fig. 8.(1 and 2)
C	4. 2.	+ +	+ +	

A = Chloroform. B = Acriflavine. C = Hydrocyanic acid.

In the first series in which inactivation of the virus by chloroform was employed the control inoculations with single inactivated fluids were made into separate birds from those receiving the mixtures containing both factors. In the later experiments (with the one exception of Expt. 13 acriflavine) separate sites of the same bird were used for control (single factor) and combined (both factors) inoculations. The change over is indicated in the table by *~~~~. This alteration was rendered necessary by the errors introduced by individual variations in susceptibility of the birds. The drawback to this form of the experiments is the possibility of diffusion of the virus to the rest of the body, so that tumours arise apparently at the point where "specific factor" alone had been introduced. A disposition of the experiment which will evade these

FIG. 7.



HCN inactivation. Expt. No. 2 HCN (vide table). 12/8/1926. Two chicks inoculated, one negative at all sites. Enhancement of result of injection of primary Berkefeld filtrate of MH, incubated with HCN 1 : 5000 30 minutes, by incompletely inactivated filtrate (55° C. 15 minutes). Incomplete separation of factors.

difficulties has not yet been devised. As will be seen from the table, the results of the chloroform inactivation experiments are inconclusive; in some all the birds are negative, in others tumours have arisen from the injection of presumably single factors.

Acriflavine and Hydrocyanic Acid Inactivation.

The details of the preparation of "virus" and "specific factor" relatively free from each other in the remaining experiments is as follows:—

(*a*) Elimination of "specific factor." Preparation of inactivated "culture" (virus suspension). The supernatant fluid of an anaerobic "culture" of the tumour in broth (22 hours) is carefully removed and heated for 15 minutes at 55° C. to destroy the specific factor.

(*b*) Destruction or diminution of virus by acriflavine, with preservation of "specific factor." To a tube of serum broth acriflavine is added in amount sufficient to give a concentration of acriflavine 1 : 3500. 0·5 g. of minced tumour is introduced and the tube incubated anaerobically for 22 hours at 37° C. The supernatant fluid is taken and spun for 15 minutes at a high speed, and the upper clear layer carefully pipetted off—"specific factor" (acriflavine).

(*c*) Destruction or diminution of virus by hydrocyanic acid. 0·5 gr. tumour emulsion is incubated anaerobically at 37° C. for 3 days in a tube of serum broth. The reaction of the supernatant fluid at the end of this time had risen to pH 6·0. To 4·9 c.cm. of the undisturbed supernatant fluid is added 0·1 c.cm. of 1 per cent. hydrocyanic acid, giving a concentration of HCN 1 : 5000. This is incubated aerobically for

FIG. 8 A.

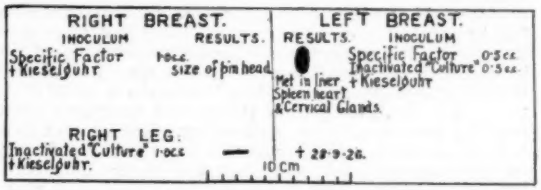
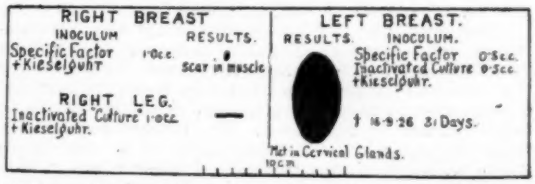


FIG. 8 B.



HCN inactivation Expt. No. 3 HCN (vide table). 16/8/1926. Two chicks inoculated. Reactivation of broth filtrate of MH, treated with HCN by heat inactivated "culture" (55° C. 15 minutes). No embryo emulsion added to inocula in this experiment.

30 minutes at 36° C., and the hydrocyanic acid then pumped off under a Geryk pump—"specific factor" (HCN).

The details of the fluids injected at the various sites, and the end-results of the experiments are shown in Figs. 4–8, and with the legends make further description unnecessary.

Expt. No. 4 HCN (vide table) gave tumours at the sites of inoculation of "specific factor" alone, and of combined factors as in Expt. No. 2 HCN (Fig. 7).

Summary.

The biology of a tumour of the domestic fowl with the structure of an endothelioma is described. It can be propagated by cellular grafts, by dried material, and by filtrates of tumour emulsion direct, or after incubation anaerobically, in broth culture media. An attempt has been made to test the validity of Gye's conception of the dual nature of non-cellular transmission for this tumour, and the results are in harmony with his views.

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THE EXPERIMENTAL PRODUCTION OF A NEW TYPE OF GOITRE UNRELATED IN ITS ORIGIN TO IODINE.*

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THE goitres hitherto produced by me under experimental conditions in animals [1] (pigeons, rats, and goats) have been of three types: the hypertrophic, the hyperplastic, and the colloid. The first may arise in animals living under unhygienic conditions of life in iodine-poor localities; it arises also in animals receiving massive doses of fæcal bacteria in admixture with their food, congenital goitre and cretinism being thereby produced in their offspring. The second may arise in animals receiving an excess of fats or of fatty acids in an otherwise well-balanced diet.[2] The third has not been produced in typical form as seen in man, but a condition simulating it in pathological features has resulted in animals from the excessive ingestion of lime in an otherwise well-balanced food.[3] With the possible exception of those caused by the administration of cultures of fæcal bacteria the goitres produced in these ways are preventable, by increasing the intake of iodine proportionately to the unhygienic conditions of life of the animals, or to the excess of fats or of lime in their food. The present paper deals with the experimental production of a variety of goitre which conforms to none of these types, which has distinctive ætiological and pathological features, and is unrelated in its origin to the iodine ingested. Its histological features are those of an intense secretory hypertrophy approaching that seen in primary Graves's disease.

In view of the comparatively wide prevalence of "simple goitre" amongst white-flour-eating peoples and of the prominence which has of late years been given to iodine deficiency as its sole cause, and to iodine prophylaxis as the only means of its prevention, it was thought desirable to ascertain whether diets into which white flour entered largely, and from which green vegetables and fruit were excluded, could give rise to, or favour the development of, "goitre" in animals receiving iodine in adequate amounts and living under conditions of the strictest hygiene.

Details of the Experiments.

Sixteen groups of young rats from non-goitrous stock, six animals in each group, were selected for this work, males and females being as far as possible equally distributed in each group and the age of the animals being approximately the same (30 to 60 days). Their initial weights ranged from 30 to 67 g. Each animal was confined in a separate cage so constructed as to render hygienic conditions of life as perfect as possible. The cages were provided with netted-wire bottoms of fine mesh through which the excreta fell into zinc trays below. During feeding time clean trays were passed into slots above the netted-wire bottoms of the cages so as to prevent loss of food; at the same time attendants went from cage to cage removing any excreta passed. The cages were washed with antiseptic lotion daily and were sterilised in boiling water at regular intervals in a specially constructed apparatus. (These precautions are absolutely essential in all experimental work on goitre in order that the factor of dirt may be excluded, this factor being of itself prone to cause thyroid changes, sometimes amounting to actual goitre, especially if the iodine intake of the animals be low.[1 5 6]) At night the animals were bedded in sterilised cotton waste. Each was given a known quantity of its particular diet daily, the balance not eaten being weighed and the daily food consumption by each animal recorded. Distilled water was provided for drinking and washing purposes. Each animal was weighed weekly and the weights charted. Clinical notes of any symptoms shown by them were kept, and a complete post-mortem examination of each was made at the end of the experiment so as to ascertain the cause of death. In animals dying before the end of the experiment post-mortem examination was made as soon as possible after death in order to limit the autolytic changes to which the thyroid gland is so liable. In none of the experimental animals was post-mortem examination delayed for longer than 12 hours; in very few for so long. The animals surviving to the end of the experiment were killed and their thyroids removed and fixed immediately. The diagnosis of "goitre" was made on macroscopical characters and subsequently confirmed microscopically. A number of non-goitrous thyroids were also examined for purposes of comparison with the goitrous, and in order to detect the earliest signs of the gland's departure from normal.

The Experimental Diets.

The materials used in the preparation of the experimental diets were American white flour, purified starch, olive oil, "meat residue" and "salt mixture." The "salt mixture" was made up as follows: Calcium lactate, 39 g.; calcium phosphate, 16·2 g.; potassium phosphate, 28·62 g.; iron citrate, 3·54 g.; sodium chloride, 5·19 g.; magnesium sulphate, 7·98 g.; sodium phosphate, 10·41 g.; and potassium iodide, 0·5 g. (McCollum and Davies).[7] The "meat residue" was prepared by a method described elsewhere.[8] The percentage composition of the diets is given in the table together with the number of cases of goitre resulting from the different diets.

Table showing the Percentage Composition of the Experimental Diets and the Incidence of Goitre.

Class of diet.	Group No. of diet.	Animals in group.	American white flour.	Olive oil.	Salt mixture.	Meat residue.	Starch.	Cod-liver oil.	Dried yeast.	Animals goitrous.
	*I.	6	100	..	..	..	..	..	..	1
A	II.	6	92	8	..	..	..	..	..	3
A	III.	6	95	..	5	..	..	..	..	2
A	IV.	6	87	8	5	..	..	..	..	3
A	V.	6	82	8	5	5	..	..	..	3
A	VI.	6	77	8	5	10	..	..	..	2
A	VII.	6	72	8	5	15	..	..	..	1
B	VIII.	6	60	10	5	20	..	..	..	0
B	IX.	6	50	10	5	20	10	..	..	0
B	X.	6	40	10	5	20	20	..	..	0
C	XI.	6	30	10	5	20	30	..	..	1
C	XII.	6	20	10	5	20	40	..	..	0
C	XIII.	6	10	10	5	20	50	..	..	3
C	XIV.	6	..	10	5	20	60	..	..	4
C	XV.	6	..	10	5	20	60	..	..	2
	*XVI.	6	..	8	5	20	60	2	5	0

* I. and XVI. are control diets.

Influence of the Experimental Diets in Causing Goitre.

There were 25 cases of thyroid enlargement among the 96 animals: a case-incidence of 26 per cent. The various diets range themselves into three classes according to their influence in causing goitre:—

(*a*) Those in which the white flour content is greater than 60 per cent. and the protein content less than 20 per cent.; fats and salts being adequate (II. to VII.).

(*b*) Those in which the protein content is constant at 20 per cent. and the white flour content is between 40 and 60 per cent.; fats and salts being adequate, and the balance of carbohydrate being made up of purified starch (VIII. to X.).

(*c*) Those in which the protein content is constant at 20 per cent.; fats and salts being adequate, while the white flour content is reduced to below 30 per cent. and the balance of carbohydrate made up of purified starch (XI. to XV.).

The control diets (I. and XVI.) are not included in these three classes.

* Abstract of a paper appearing in the July issue of the Indian Journal of Medical Research. Published by permission of the Director-General, Indian Medical Service.

Goitre occurred in the first and third classes to an almost equal extent (38·9 and 33·3 per cent. respectively), but not at all in the second class; this does not mean that diets of this class cannot cause goitre, but that they did not cause appreciable enlargement of the gland in this experiment.

There were eight diets (I., II., III., IV., XII., XIII., XIV., and XV.) which failed to ensure even a moderate rate of growth. These may be excluded as unlikely to be of a composition comparable to any diets used by white-flour-eating peoples. They have, however, served a useful purpose in the experiment by indicating that insufficiency of vitamins of the B class is a principal dietetic fault concerned in the production of this type of goitre. There are left seven diets (V., VI., VII., VIII., IX., X., and XI.) into which white flour entered largely; these ensured a rate of growth which, though not perfect, was at least considerable. The following facts in regard to their association with goitre are to be noted:—

1. Those containing 72 per cent. or more of American white flour and 15 per cent. or less or protein, the fats and salts sufficing for normal needs, caused noticeable goitres in 33·3 per cent. of young rats, despite the adequate ingestion of iodine.

2. Those containing 20 per cent. of protein and between 40 and 60 per cent. of American white flour, the fats and salts sufficing for normal needs, did not cause goitre.

3. One diet containing 20 per cent. of protein and 30 per cent. of American white flour—the balance of carbohydrate being made up of purified starch and the fats and salts sufficing for normal needs—caused goitre in one out of six animals fed upon it, despite the adequate ingestion of iodine.

The conclusion is thus reached that diets having the composition of those in Groups 1 and 3 above will cause goitre in approximately 25 per cent. of individuals consuming them, despite the adequate ingestion of iodine. The amounts of potassium iodide ingested with these diets ranged between 0·4 and 2·6 mg. per rat daily.

Among the 16 experimental diets there were two (Nos. I. and II.) which caused goitre in 3 out of 12 animals; no iodine was added to them. The goitre arising in consequence of their consumption did not appear to differ histologically from those caused by the other diets. The further conclusion is therefore reached that the pathogenesis of this type of goitre was independent of the amount of iodine ingested with the food.

Sex-incidence of the Goitre.

Of the 96 animals used in this experiment 42 were males and 54 females. There were 9 cases of goitre in males, 16 in females; a case-incidence of 21·4 per cent. in males and 29·6 per cent. in females. Taking into account only the goitre-producing diets (V., VI., VII., and XI.) which ensured fair growth in the young rats consuming them, there are 24 animals to be considered. Of these 13 were males and 11 were females. Goitre occurred in 1 male only, while 6 females were affected by it; a case-incidence of 7·7 per cent. in males and 54·5 per cent. in females. Although the figures are small, yet this difference in sex-incidence appears to be sufficiently marked to justify the conclusion that females are much more likely to suffer from this type of goitre than males—a significant conclusion in view of the probable relationship of this type of thyroid change to Graves's disease and myxœdema (vide infra), and of the higher incidence of these conditions in the female sex.[9]

Pathology of the Goitre.

Macroscopically the goitres are of glistening, fleshy appearance, bright or darkish red in colour; they stand out prominently against the surrounding tissues. They are of small size, being from 50 to 100 per cent. larger than the normal organ. The isthmus is usually prominent, thickened, and broadened. Commonly one lobe is more enlarged than the other; occasionally the enlargement is unilateral.

Microscopically the earliest evidence of change is seen in glands which are not appreciably enlarged, but which appear bright coloured at post-mortem examination. More or less circumscribed areas (Fig. 1)—commonly in the isthmus, the posterior border, and the lower pole of one or other lobe—are seen to be depleted of colloid material or to be in process of depletion. The affected area assumes a cellular structure composed of a more or less solid mass of epithelium. This mass—the so-called intervesicular parenchyma—increases in bulk at the expense of the colloid containing follicles appearing gradually to invade them and to crowd them out; some of these follicles contain larger or smaller numbers of free cells. Here and there the solid mass of epithelium is vesiculated by the collection among the cells of pools of new secretion (not colloid).[9] The cells subtending these pools present the typical features of secretory activity (Figs. 1 and 2), rather deeply-staining nuclei located at their base, and faintly basophil and granular cytoplasm. Passing from such non-goitrous glands to specimens of the actual goitres, one sees the more extensive crowding out of colloid-containing follicles until in some sections there may be but two or three and occasionally none at all (Figs. 3 and 4). Such colloid-containing follicles as exist are of normal appearance; the colloid deeply eosinophil, the acinar cells flattened or more commonly cuboidal, nuclei centrally placed and evenly distributed, and cytoplasm homogeneous and faintly acidophil. The whole or almost the whole organ is thus gradually depleted of its stored colloid material and the normal structure of the gland is replaced by tissue in a state of intense secretory activity (Fig. 2). Nowhere in the gland is "vesicular budding"—so conspicuous a feature in the experimentally-produced hyperplastic goitre—to be seen. The perifollicular reticulo-endothelial system, described by Williamson and Pearse,[10] stands out prominently owing to its affinity for hæmatoxylin; many of its cells are swollen, but the stains used did not permit of the definition of its cytoplasmic granules (Fig. 3). Here and there this system is subtended by a number of round cells—sometimes forming considerable collections (Fig. 3)—which appear to be lymphocytes. In goitrous animals dying between the fortieth and the seventy-fifth day of the experiment these may be the only appearances seen, there being no appreciable increase in the fibrous stroma of the gland and the secretory epithelium showing no marked signs of exhaustion. But in goitrous animals which survived to the end of experiment (165 days), and were then killed, this earlier and progressive stage is seen to have given place, in greater or lesser degree, to appearances indicative of a breaking down of the gland's compensatory mechanism. In this retrogressive stage exhaustion of more or less epithelia occurs and there is a relative increase in the fibrous stroma of the gland (Fig. 4). The process is one of intense secretory activity with a gradual depletion of the gland's store of thyroxin-containing colloid and with little or no attempt at completion of its cycle of activity and the replacement of colloid. It is a condition which in its *early stages* might possibly be precipitated into one of Graves's disease by such additional excitants as fright, mental worry, pregnancy, lactation, and attacks of acute infectious diseases, such as influenza and acute rheumatism. In its *later stages*, however, exhaustion of a greater or lesser number of the gland's secretory elements takes place, and these are replaced by non-secretory elements in amounts foreign to the normal organ. Proportionate degrees of thyroid insufficiency will thus result with clinical manifestations of myxœdema commensurate with the degree of insufficiency.

Dr. Williamson and Dr. Pearse, to whom sections of *early* cases of this type of goitre were sent for opinion, consider the histopathological picture to be one of intense secretory hypertrophy almost approaching the complete heterotrophy of the *adenoid goitre* of primary Graves's disease,[11] a condition which, if prolonged, will result in failure of the gland's

compensatory mechanism and the production of a state resembling that to which they have applied the term *lymphadenoid goitre*.[11] That this sequence of events does actually take place is apparent from the series of photomicrographs (Figs. 1 to 4) illustrating the histopathological picture from its earliest to its latest stages.

Cause of the Goitre.

The fundamental cause of this type of goitre is a dietetic one; its exciting cause is a different matter. The influence of faulty food in causing it is made apparent by the complete freedom from it enjoyed by well-fed stock rats in this laboratory. The stock diet consists of whole wheat flour (*chapattis*), sprouted grain, milk, butter, and abundance of green leafy vegetables and raw tubers (potatoes and carrots), with fresh meat occasionally. The dietetic cause of the goitre lies, therefore, in the differences in quality between the stock diet and the experimental diets. In comparison with the former the latter contained an insufficiency of accessory food factors belonging to the vitamin B class;† they were also deficient in vitamin C, in vitamin A, in manganese, and in vegetable juices and roughage (cellulose and the indigestible parts of plants), while they were rich in vitamin-poor carbohydrate. Although it seems probable from the results of the experiment (Table I.) that the insufficient provision of vitamins of the B class was the principal dietetic cause of this type of goitre, yet I am reluctant to attribute it wholly to this cause. For the present it is enough to say that it is prone to rise when green vegetable foods and fruit are excluded from a diet containing more than 60 per cent. of white flour, less than 20 per cent. of protein, and fats and salts (including iodine) in adequate amounts.

There is another aspect of the causation of this type of goitre. All animals in each group were fed alike. There would seem at first sight to be no more reason, on dietetic grounds alone, why one or two animals in any one group should become goitrous than that the remainder should not. It is true that among the non-goitrous remainder there were some whose thyroids presented changes in *part of the gland* similar to those found in the goitrous organs; but there were others whose thyroids were to all appearances normal. Nothing, however, is more striking in the pathogenesis of deficiency diseases [4] than the variability of the effects of faulty food on different individuals and on different organs and tissues of the body. In one the nerves, in another the heart, in a third the gastro-intestinal tract may be so injured as to dominate the clinical scene. So it may be in the present instance; the faulty diets used in these experiments may have induced in some thyroids a graver state of physiological inefficiency than in others, and the changes in the goitrous glands may represent the attempt made by the physiological subnormal gland to attain to a state of compensation. In this attempt it must inevitably fail since its malnutrition renders it inefficient as a machine.

On the other hand, the faulty diet per se may not have been the essential cause of the disease, but have favoured the action on an ill-nourished and physiologically subnormal gland of some goitrigenous agent peculiar to the animals which developed goitre. The diets with which the goitres were associated gave rise to a physiologically subnormal, and sometimes to a pathological, state of the gastro-intestinal tract; and it is possible that the exciting cause of the disease may have been of intestinal origin and of toxæmic nature. I have previously [9] postulated the existence of such "toxæmic goitres" in constipated and imperfectly nourished girls. The present paper suggests at once the cause of the intestinal stasis (insufficiency of vitamin B) [4] and of the "toxæmic goitre" which may accompany it. While the cure of simple goitre which may so rapidly follow the removal of the stasis,[9] without change in the state of nutrition of the subject, lends support to the view that the thyroid enlargement is in such cases of toxæmic origin. It may be, again, that faulty diets such as those used in these experiments give rise to different biochemical disturbances in different individuals with the production in some of abnormal metabolites which excite the thyroid unduly or deplete it of the hormone necessary for their combustion.

There are thus three sites at which the essential cause of this type of goitre is to be sought. The first, in the gland itself, where inefficiency of the thyroid machine may be brought about by its malnutrition with impediment to the normal revolution of its cycle of activity; the second, in the body fluids and tissues where imperfect metabolism may be assumed to result in the production of abnormal metabolites and to cause depletion of the thyroid hormone necessary for their combustion; and the third, in a physiologically subnormal or pathological alimentary tract whence bacterial agents or their toxins may find their way into the circulation and induce pathological changes in the thyroid gland. But at all three sites the common factor is imperfect nutrition induced by the faulty food; the general statement I have already made as to the dietetic cause of this type of goitre will serve until we know more of the part played by the thyroid gland in the animal economy and of the biochemical phenomena associated with faulty nutrition.

Commentary.

In view of the confusion which exists in regard to the causation and prevention of the thyroid diseases included under the generic term "simple goitre" the results of these experiments are illuminating. If, as seems likely, the type of goitre here described be found to occur sporadically amongst white-flour-eating peoples, then the view that all "simple goitres" are due to iodine deficiency and preventable by the prophylactic use of iodine must be abandoned. The relation of iodine to each type of "simple goitre" must be definitely defined; this has been attempted [12] for the classical type of endemic goitre—the chronic hypertrophic or parenchymatous type; it remains to be done for the diffuse colloid type of endemic goitre.

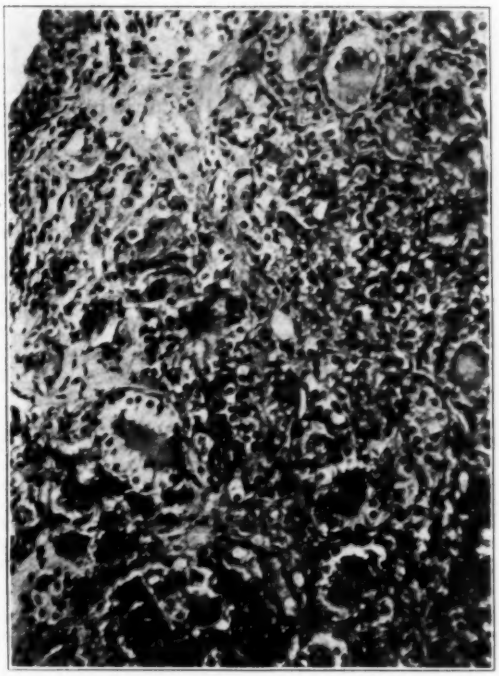
The experimental evidence here provided makes it probable that in Western countries this new type of goitre will be encountered in its progressive stage in childhood and in young women of the working classes whose food contains much vitamin-poor carbohydrate, little suitable protein, and less green vegetables and fruit; and in its retrogressive stage in older subjects whose food has similar faults. If this should prove to be so iodine will neither prevent nor cure the disease, but a well-balanced diet rich in vitamins will. These matters can, however, only be decided by clinical and epidemiological observation, and by "goitre surveys" which take into consideration the food habits of the people and are not limited to one section of the community—the children. Outside the laboratory it will probably be found that the purity in type of this variety of goitre may commonly be obscured by the interaction, with the nutritional factors which give rise to it, of other goitrigenous influences, such as the ingestion of an excess of lime or of fats, and insanitary conditions of life both intrinsic and extrinsic to the individual. Such influences as these may be expected to distort its characteristic histopathological picture and give variety to the characters of the goitres met with in different individuals or in different localities. Further, it can hardly be doubted that the pathological features of the "endemic goitres" will be influenced by the food habits of residents in endemic zones; where white flour is the staple article of diet and milk and green vegetable foods are scarce endemic influences may be expected to give rise to a pathological picture in the thyroid gland which will differ in detail from that resulting in localities where whole wheat flour is used and milk and vegetable foods are abundant.

† Experiments now in progress appear to indicate that there are two fractions in vitamin B: a growth-promoting fraction and an antineuritic fraction; white flour is not devoid of the latter, but is very deficient in the former; polished rice is very deficient in the latter.

FIG. 1.

Non-goitrous thyroid of rat fed on diet No. VI. (see table); animal killed on the 165th day of the experiment; shows the earliest stage of the process described in the text.

FIG. 2.



Goitrous thyroid of rat fed on diet No. VI. (see table); animal killed on the 165th day of the experiment; shows intense secretory hypertrophy with commencing invasion of the gland by fibrous tissue.

FIG. 3.

Goitrous thyroid of rat fed on diet No. XI. (see table); animal died on the eighty-third day of the experiment; some autolytic changes are present; shows state of secretory hypertrophy and prominence of the perifollicular reticulo-endothelial system.

FIG. 4.

A late stage of the process showing exhaustion of epithelium and invasion of the gland by non-secretory elements; animal died on the 127th day of the experiment.

Summary.

(1) A new type of goitre has been produced, under experimental conditions in young rats, which is unrelated in its origin to iodine deficiency.

(2) It is to be distinguished ætiologically, pathologically, and epidemiologically from the chronic hypertrophic or adenoparenchymatous type of endemic goitre and from the diffuse colloid type of endemic goitre.

(3) The basal factor in its causation is a diet containing more than 60 per cent. of white flour or of vitamin-poor carbohydrate, 20 per cent. or less of protein with fats and inorganic salts (including iodine) in adequate amounts, but no green vegetables nor fruit.

(4) The goitre arising in these circumstances is characterised by intense secretory hypertrophy which ultimately leads to exhaustion of more or less of the epithelia and its replacement by non-secretory elements and fibrous tissue. These changes may be present without any marked increase in size of the gland.

(5) It seems likely that this type of goitre will be found to occur sporadically amongst white-flour-eating peoples; that the subjects of its progressive stage will be prone to develop Graves's disease, following such influences as fright, mental worry, pregnancy, lactation, and attacks of acute infectious disease; and that the subjects of its retrogressive stage will exhibit greater or lesser degrees of myxœdema.

(6) If this type of goitre be found to prevail sporadically in white-flour-eating peoples the additional provision of iodine in the food will not prevent it, but a well-balanced, vitamin-rich diet will.

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ROYAL WEST SUSSEX HOSPITAL.—This hospital has exceeded its income by £2640 this year. At the annual governors' court on April 12th sanction was given to sell out investments or to transfer from the trustees' account sufficient money to liquidate the deficit. Not so very long ago the hospital increased its accommodation from 60 beds to 100 beds; it is considered that the change has been thoroughly justified by the use made of the beds. From 978 in-patients and 717 operations in 1923 the figures in 1926 were 1289 and 1153 respectively. The financial position, however, caused great anxiety. A contributory scheme was launched six months ago, and since the annual meeting of the governors a total of nearly 9000 contributions has been received, covering some 20,000 people. Compared with the progress of similar schemes in other parts of the country the governors consider that a very satisfactory start has been made, and by the end of the first 12 months it is hoped that the number of contributions will be up to 15,000. Good progress is being made in regard to the centenary scheme which was launched early in the year; the scheme is to raise a sufficient sum to provide additional accommodation, including better quarters for the nursing staff and the establishment of beds for maternity cases.

SOME REFLECTIONS ON THE TREATMENT OF FRACTURES OF THE LIMBS.

WITH SPECIAL REFERENCE TO THE INITIAL TREATMENT.*

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THE subject of fractures has now absorbed my attention for some years past. It deals with a somewhat neglected branch of surgery, and I offer during this discourse some practical suggestions which I hope may interest you and at the same time attempt to bring nearer perfection the condition of a patient who may be suffering with a broken bone. In bygone days fractures, amputations, lithotomy, and herniotomy were foremost in our surgical procedures. Then, with Lord Lister's discovery of the bacterial origin of inflammation and the approach of aseptic technique, a new age began in surgery. Amputations were displaced from their former exalted position and new tracts of the body were conquered in the regions of the abdomen, the thorax, and the brain.

The rapid advances made during the last 40 years have cast an illusion over the eyes of the younger generation of surgeons who have, perhaps, thought that all might be cured by the knife alone. There has been so much discovered that was new, both to teacher and student, that the treatment of fractures was, for a generation or so, apparently allowed to fall into the background as a subject on which our grandfathers had said the last word.

In most of our medical schools the treatment of fractures is only too often assigned to junior officers. Nor is this all. The demand for beds is so pressing that a house surgeon will gain no favour if fractures are admitted in numbers or retained for long. Hence the immediate application of plaster and its attendant evils—stiff limbs, wasted muscles, and pressure sores. In each medical school customary methods have during the years become stereotyped, until at the present time it is often possible to name the school in which a man has been trained by the splints and methods he employs for the treatment of any particular type of fracture.

Modern Diagrams and Treatment of Fractures.

The very commencement of the twentieth century however, marked an epoch in the history of fractures, for Prof. Roentgen's discovery of X ray in 1895 and its application to the study we are now discussing wrought a wonderful change in our views and in our methods of treatment. X rays enable the surgeon to see the actual condition of the fractured bone, and the radiograph is to the surgeon what the ophthalmoscope is to the ophthalmologist and the cystoscope to the urologist. By its correct application he gains information as to the true state of affairs in the condition with which he is dealing, analogous, in diagnostic value, to the exploratory laparotomy of the abdominal surgeon. Still more recently the experiences of the great war subjected the accepted modes of treatment and appliances to a supremely severe test, exposed their weaknesses, and forced us to evolve new methods as well as to improve the old.

Without good X ray films it is impossible to be sure of obtaining the best results, because a great variety of pathological details may be learnt from a careful study of them.

1. The presence of a fracture.
2. The variety and position of the fragments.
3. A coexisting dislocation of, or other injury to, a joint.
4. The presence and situation of gas-gangrene and of air in the soft parts.

* An address delivered at St. James's Hospital on Jan. 26th, 1927.

5. The presence of bipp.
6. The formation and character of callus and the solidity or otherwise of new bone formed.
7. Comparisons of films taken if possible in two planes at specified regular intervals during the treatment offers the best means of arriving at a correct prognosis.
8. Before operation it can be decided what variety of internal mechanical fixation will be most successfully used for that particular problem.
9. While manipulating under the screen immediately before the application of a splint or plaster-of-Paris one finds out by verification the areas on the limb to which the reconstructive forces have to be applied in order to maintain the corrected position of the fragments.

In this country, as you are aware, the British Medical Association appointed a Special Committee of Inquiry in 1912. The records have been compiled with such care, accuracy, and impartiality, that it is a document of the first magnitude. Taking all the statistics together, they prove that if the anatomical result is good the functional result is good in 90 per cent. of cases, while if the anatomical result is bad or moderate a good functional result is obtained in only 29 per cent. of cases. My own experience entirely supports these findings.

Each new fracture is a *fresh problem* and its diagnosis and treatment cannot be controlled by a set of rules which were formulated and did excellent service at a time when the surgeon's vision had to be projected through his finger-tips. X rays must be used at every stage if one is to be successful in the treatment of fractures; it is also essential that a mobile X ray plant should be available, to be brought to photograph the patient's limb when he is lying in bed. The moving of a patient to an X ray room is liable to interfere with the extension which is being maintained, and thereby may jeopardise the end-result of his treatment. If mobile X ray plants were available for the use of any practitioner who required one, in my opinion great advantage would accrue both to the patient and the profession. This is no new suggestion, and it was actually in practice at No. 8 Stationary Hospital, which was a hutted unit, from January, 1916, until the end of the war. On account of the principles adopted for treatment and of my strong objection to moving patients on a stretcher to the X ray department, it became necessary for us to devise a mobile X ray plant, which was placed on a B.R.C.S. motor ambulance, and the scheme turned out to be so satisfactory that radiographs could be eventually taken anywhere in Boulogne base by one of these specially fitted motor-cars.

In institutions I am convinced that segregation of fractures under the care of surgeons and nurses who have a special aptitude for and training in the subject will turn out the best results and be the quickest means of returning most, if not all, of the lost functions.

It is to Sir Almroth Wright I must tender my unforgettable thanks for pleading with and obtaining permission from G.H.Q. in France to first segregate the fracture cases and for assembling the selected personnel and matériel at No. 8 Stationary Hospital, Wimereux, in 1915. The results, I was informed, were so satisfactory that Sir Robert Jones and Sir Arbuthnot Lane started the hue and cry, and other similar organised units were commenced both in Great Britain and France, and such beneficial results followed that I had hoped that the scheme which had been proved such a success would be more generally adopted than it has been in civil and military hospitals after the war.

Importance of First-aid Treatment.

Even after the countless lessons we learnt in the war, is it not tragic to still hear Sir Robert Jones state that "the treatment of fractures in this country leaves much to be desired"? When a medical man is called upon to attend a case of fracture of a limb, the occasion is generally that of an accident on a race-course, a motor smash on a country high road, or, possibly, an ordinary street or factory casualty. In the latter two instances one is more conveniently placed, as the personnel and material for treatment are probably more ready to hand, whereas in the former urgencies this is generally not so. But in all cases the treatment should commence from the time that the injured person is first seen by the surgeon or first-aid worker, and should be continuous and consecutive until cure is effected.

Even the help of modern fracture equipment, the X ray screen, and a large and varied experience of manipulative treatment of deformities does not necessarily ensure that this form of treatment will be unfailingly successful in producing perfect reposition; it is therefore inevitable in a percentage of cases to have to apply such useful expedients as mechanical pulls, and when these fail, then to attack the seat of fracture by direct operation, with plating, wiring, bolting, bone-grafting, &c. When this is indicated, the operation should be done within a short space of time after the injury, and then only when perfect asepsis can be obtained. In any case, the surgeon's immediate action is demanded by the fracture, which may be either simple or compound.

The same general initial treatment by immobilisation, as laid down by Hilton in his classic on "Rest and Pain," in 1863, is as essential for broken bones and their surrounding soft parts as for every other kind of damaged tissue. In a fracture case the only condition which has a prior claim to immobilisation in receiving attention is hæmorrhage.

During first-aid treatment, if there is serious bleeding, the wound must have first attention, but when the patient is in no danger from the loss of blood the limb should at once be immobilised by extension and the clothing afterwards cut away for the purpose of applying a temporary dressing to the wound. The further progress of the case depends upon the promptness and thoroughness with which the management of the wound is carried out, but I certainly do not advocate the mass excision sometimes seen during the war. Excision of tissues should always be as conservative as possible.

The principles of the treatment of hæmorrhage are well established, but may I strike a note of warning for the cautious use of the tourniquet and to restrict its use to cases of dire necessity. The employment of it, except as a temporary measure during an operation, is often a source of danger both to life and limb. However, if it has been applied it should be made open to the knowledge of all, and it is the duty of the surgeon who next sees the patient to remove it at once and to examine the limb so as to ascertain whether the bleeding has ceased, if not, to employ proper measures for its arrest.

In all cases in which it can be efficiently carried out steady digital compression is the best method to employ, but I have occasionally placed an elastic tourniquet loosely round a splinted limb and sent an attendant with instructions to draw the ends gradually tight if necessary, but only up to that point which stops bleeding. There is often under the strain of an emergency an inclination to apply it more tautly than is required to prevent the escape of blood, and this may eventually determine the fate of the limb or even that of the life.

Essentials of Treatment.

The first essential is to steady the limb and temporarily fix the broken bone or bones, so that no further movement of them is permitted; by so doing hæmorrhage, further laceration of soft structures and shock, which is markedly aggravated by pain, by loss of body heat, and by hæmorrhage will be minimised if not prevented. Thus a patient with a fractured femur may, if he be kept quiet, properly splinted, and adequately warmed never exhibit any signs of shock, while another with a similar injury may pass into a dangerous state of collapse if insufficiently splinted and exposed to cold. Shock is, after all, proportionate to the sum of the intensities of the factors causing it. The initial force used for

the purpose of extending the limb, when once it has been applied, should never be allowed to relax as by so doing the fragments are made to travel. These may be jagged, sharp, and dangerously spiked ends, especially in oblique and spiral fractures, and in comminuted cases the fragmentary bone may be in extraordinary penetrating shapes and positioned in every direction varying according to the tension exerted on the tissues in which they are embedded, and every time they are allowed to return in the recoil they may, perchance, retrace their path, but how often are new tracks made both in the early stages of treatment and later during manipulation with the possibility of damaging important vessels and nerves, and not only this, but each thrust into the old or into a newly manufactured passage will aggravate the exudation in simple fracture, and spread infection as well much more widely in the compound one. Muscular and areolar tissue have comparatively a very small resisting power to infections, and this is still further lowered by these additional traumata.

For these reasons the extending force should be continuous and never relaxed from the first pull until we see early callus around and between the cleavage sufficiently firm to cement the fragments together, when the consideration of the early movements of the joint will, in their turn, come before us and be carried on through that period when the callus can be bent and angulations have, therefore, to be carefully guarded against up to the time that the union is solid and the limb need no longer be held under restraint.

The Value and Range of Usefulness of the Thomas Splint.

In the case of the upper extremity, bandaging the arm to the side may, perhaps, be sufficient as a first-aid measure, but in the case of the lower extremity some form of splint is required, and there are two splints which do efficiently meet the case in all fractures of both upper and lower limbs. These two splints have been so well tested and proved in the Great War, that I cannot conceive any more critical trials to which an apparatus could be subjected.

In the leg, the *first-aid treatment of all fractures above the ankle-joint* can be efficiently carried out by the application of the Thomas knee splint, which is by far the finest piece of apparatus in our fracture equipment. It is applied in the following way:—

If there be a selection of splints with different sized rings to hand, then the transverse circumferential measurement of the thigh over the trousers should be made at the gluteal fold. To this figure add 1 inch to allow for the obliquity of the ring and 2 inches for possible subsequent swelling, and this should be the inside circumferential measurement of the padded ring. Thereby all accessory padding which would be necessary for an unduly large ring will be obviated.

Maintaining manual extension on the ankle *all* the time, the leg is threaded through the ring of the splint without removing the trousers. The ring is pushed up gradually and firmly against the tuber ischii and kept there by the operator, who holds the distal end of the splint against his own thigh, at the same time supporting the patient's leg posteriorly at the site of fracture with one hand and maintaining the extension on the ankle with the other, which is held underneath the inner side bar. An assistant takes a 6-inch roller bandage, ties the end to the outer side bar near the ring, and passes it behind the thigh from side to side, first over the inner bar and then back over the outer one, and so on until the whole of the posterior aspect of the limb is supported, the bandage is then fixed to one or other of the side bars, an assistant now takes the extension on the limb from the operator.

If the operator has a "boot clamp" he fixes it obliquely to the sole of the boot; if not, he then takes a rigid metal rod or skewer about 12 inches long and 3/16 inch in diameter, pointed at one end. This is passed obliquely through the boot between the sole of the foot and the sole of the boot. The hole on the outer side should be about 3 inches from the anterior surface of the heel and the inner hole 1 inch from this same surface. This allows the leg to lie and to be fixed in external rotation, which is the natural attitude of the leg in the recumbent position, and the one in which it ought always to be ultimately splinted. A cork or narrow roller bandage is placed over the pointed end of the skewer for safety and a piece of tape or bandage attached to each extremity of the skewer. These are passed, the one just above the level of the side bar and the other just below it, made taut and tied to the V-shaped notch at the end of the splint, with sufficient tension to maintain the requisite extension. If a boot clamp or skewer be not available the extension can be made with a timber hitch of bandage.

The patient is lifted on to a stretcher and a "suspension bar" is applied, from which the side bars of the splint are slung. After a limb has once been splinted, the side bars of the Thomas should never be allowed to rest on the same plane as that on which the patient's body and sound leg are lying.

If this occurs, the side bars fall back and the limb is forced too far forward, thus increasing the deformity, causing pain, and so altering the correct relative position of the limb to the splint into a faulty one. An alternative method of raising the splint is either to attach a "splint prop" to the end of the splint, or to rest the end of the Thomas below the level of the heel of the boot, on some form of support, such as rolled-up clothing, &c., but a suspension bar, if available, is far more efficient.

The clothing should be cut off the leg at the site of the fracture, so as to deal with the wound in a compound case, and in a simple one to be warned if the bone ends are likely to come through the skin.

If a wound be present, the skin round it should be sterilised by painting with 3 per cent. picric acid in methylated spirit, any obvious dirt or other foreign body picked out, and the picric solution applied to the superficial surface only of the wound, which is then covered with a sterile dressing, and a prophylactic dose of tetanus antitoxin given. A firm pad may be placed on either side of the knee between the limb and the side bars and the leg and the splint bandaged at this level; this will give greater security, and will compensate for the extension through the foot not being a very great one.

Cotton-wool or padding should be placed in the space, if any, between the thigh and ring of the splint, so as to make an unduly large ring fit more accurately. Any such padding between the outer bar and the thigh wall will prevent the ring from slipping inwards, losing its purchase against the tuber ischii and so coming in contact with the middle line of the perineum and the symphsis of the pubes. But none of these expedients can be assumed as lasting, nor can they be compared in any degree to the efficiency of a correctly fitting ring.

Padding between the anterior half of the ring and the anterior surface of the thigh will render it impossible for the leg to be lifted up into the forepart of the splint thereby allowing the ring to slip up beyond the ischial tuberosity. This is an all-important point, for the tuberosity is the only place on which the counter-extension can be taken.

Too much extension must not be taken through the foot, and this extension must only be considered as temporarily applied for transport to hospital or nursing home, where permanent extension is substituted as soon as possible. If the temporary extension is too great or persisted in too long, pressure of the boot, especially in cold weather, will cause obstruction of the dorsalis pedis artery. This remark similarly applies to extension by means of any noose round the ankle or wrist.

First-aid treatment of the arm.—Every fracture above the lower third of the forearm can be efficiently treated by the application of the "swivel arm Thomas splint." This instrument differs from "Thomas knee splint" only in that the ring is round instead of oval and made to swivel at the points of attachments to the side bars, to which it does not lie obliquely. The application of the splint is very simple.

A temporary extension is taken by means of a "timber hitch" of bandage placed over the well-padded wrist. The two ends of the bandage are tied to the end of the splint, with a pull sufficient to immobilise the fracture. The counter-extension is taken from the anterior and posterior axillary folds when the arm is at the side, but from the side wall of the chest in the region of the armpit when the arm is abducted. This apparatus allows the arm to be brought into the side of the body without increasing the extension and so facilitates the transport of the case.

A circular bandage is applied enclosing the arm and side bars from the hand up to the ring of the splint in order to complete the immobilisation of the fracture. The splint is equally suitable both in the initial and subsequent

treatment of any fracture of the arm from the shoulder downwards, but for permanent treatment additions are superimposed to the splint and the patient remains recumbent. The fracture having been extended and immobilised the patient is now ready for transport in an ambulance or train. He should be kept warm to combat shock and pain until he arrives at hospital, and morphine may be administered with the same objects in view. On admission to hospital the patient is not necessarily removed from the stretcher at once. A varying degree of shock may contraindicate removal and suggest rather rest and resuscitative measures for some hours. Deaths from shock were eventually reduced from 80 per cent in 1915–16 to 20 per cent. in 1917–18 by the early efficient application of the Thomas splint.

As soon as the patient is in a fit state, anteroposterior and lateral radiographs should be taken or a stereoscopic pair may be substituted, if the injury is too high up for the lateral view to be secured. The further procedure will be governed by the clinical findings and the interpretation of these radiographs.

The possibility of a nerve lesion should always be considered. Injuries of the peripheral nerves are liable to be overlooked, as the symptoms are frequently overshadowed by the manifest pain at the site of the fracture. It is preferable to make this diagnosis before a general anæsthetic is administered. Furthermore, a more accurate prognosis can be offered.

If perchance X ray examination is not available, then the fracture is put up in the best position as ascertainable by the eye and hand, and by comparing the measurements with the other limb. Extension is applied until reduction of deformity is judged to have taken place and a second pair of radiographs, if possible, is taken with the patient in bed without altering any details of splinting. This will afford a correct appreciation of the condition which is present, and prove conclusively if the reduction or setting of the fragments has really been accomplished, or if further manipulation be required.

When the position is satisfactory the next pair of radiographs is taken when the fracture is beginning to organise, and this gives an insight to the progress of the case and if the correction is still being maintained.

When callus is visible further attempts to obtain exact apposition (not already obtained) will no longer be possible unless open operation is undertaken. The necessity for this will, of course, depend on the amount of deformity presented, the loss of function that will follow if the displacement is not dealt with, and the delayed convalescence which will ensue.

However young callus can be bent, and may be likened to a candle in a candlestick on a hot day in summer. It will bend to almost any degree, and so will callus if it be subjected to a gradual and constant force. But, just like a candle, it will crack if too abrupt a strain be put upon it, such as a speedy attempt to correct deformity. Still the correction of alignment can often be obtained by a slow and regular stress. Before allowing a patient to walk without the aid of apparatus, two radiographs should always be taken in planes at right angles to one another. This is the most accurate way of estimating the amount of consolidation that is present in length, in breadth, and in thickness. It is sometimes possible in a recent fracture to obtain a radiograph in one plane which will not show any bony lesion whatsoever, whereas one taken at right angles to this will reveal gross deformity; in this case a grave error in diagnosis and prognosis will result from the taking of the picture in only one plane.

A fracture, from the point of view of treatment, must be considered not only as a solution of continuity of bone, but also as a lesion possibly affecting muscles, vessels, joints, ligaments, nerves, &c. The ideal treatment of a fracture should have for its object complete anatomical reposition of the injured tissues with complete restoration of functional power to the effected part. Our aim, therefore, in the treatment of every fracture should be to produce a limb in the most expeditious way as nearly as possible the equal of its healthy fellow, both in function and in appearance.

It is impossible to conceal the reality that a great deal of restorable function is lost by lack of proper early attention and that subsequently countless cripples are produced whose only real enjoyment of life is to blackguard us as a profession or the institution in which they were treated.

I feel sure that improved results will be *only* obtained when some well-tried method which is efficient, really simple and comfortable is more generally taught and employed.

THE EXPERIMENTAL PRODUCTION OF IMMUNITY AGAINST METAZOAN PARASITES,

AND AN INVESTIGATION OF ITS NATURE.

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THE experiments described briefly in this paper were carried out in Freetown, Sierra Leone, during the year 1926 and part of 1927. The work was undertaken with two main objects. The first of these was to confirm statements previously made regarding the existence of immunity to metazoan parasites; the second was, given such confirmation, to discover whether the laws which govern metazoan immunity are similar to those which govern various forms of bacterial immunity. The full account of our experiments will shortly be published in the *Annals of Tropical Medicine and Parasitology*.

The experiments were conducted according to a plan which has enabled us to afford complete proof of the existence of an acquired immunity which conforms with the following rigid definition:—

> An immunity acquired as the result of previous infection or vaccination, and involving the death of the metazoan parasite in the host within a specified time.

This definition clearly excludes the condition of metazoan tolerance described by various writers, in which a host naturally susceptible to, and adversely affected by, a given metazoan parasite may harbour increasing numbers of such parasites with no increase of, or even with diminution of, adverse effects. Weinberg and Julien [1] (1911) concluded as a result of their experiments that horses infected with a certain number of ascarids gradually immunised themselves against the action of the products of secretion of these parasites. Gordon's [2] (1925) record of the heavy parasitic infection with ankylostomes which occurred in natives in West Africa, in whom little adverse effect of the infection could be observed, probably comes under this head. Such conditions are not immunity in the sense in which we use the word above, for although there appears to be an immunity acquired against the toxic effects produced by the parasites, the parasites themselves are not destroyed.

Previous Records.

Surprisingly few records are in existence of the experimental proof of immunity acquired against metazoan parasites as a result of previous infection. Fujinami [3] (1916), in a paper entitled Immunity to Macroparasitic Disease, Can it be Acquired? records such acquired immunity against schistosomes. A horse which had recovered from an attack of schistosomiasis and was free from infection was exposed with two control horses to water heavily parasitised with cercariæ. One of the controls died within two months, and at the autopsy over 20,000 worms were recovered from its portal system; the second control was killed after an interval and from its portal system 10,000 worms were recovered. In the experimental animal which was killed at the same time as the second control, not a single worm could be found in spite of the most careful search. Blacklock and Thompson [4] (1923) proved experimentally that immunity can be acquired both by man and animals against the larva of a fly which causes cutaneous myiasis in Africa. The fly is *Cordylobia anthropophaga*, popularly known as the tumbu fly; its larva penetrates the skin of man or animals and resides there during the period of larval development which lasts about ten days; it produces lesions resembling boils; the

immunity is produced by previous attacks and it was shown not to depend on age.

That immunity against certain metazoan parasites may in some cases develop as the result of age alone, quite apart from previous infection, appears proved by the work of Herrick [5] (1925) who experimented with chickens as the host animal and the worm *Ascaridia perspicillum* as the metazoan parasite. This observer found that chickens of over 100 days old have, by their age alone, no previous infection having occurred, developed a high degree of immunity against the parasite. Previously, Ransom [6] (1921) had found that young chickens were easily infected with the gapeworm, *Syngamus trachealis*, while old chickens were difficult to infect; again (1922) the same writer had concluded that age itself was an important factor in the production of the complete or partial immunity enjoyed by pigs of mature age against ascaris.

The Present Experiments.

For our experiments we again made use of the larvæ of cordylobia, largely because they can be kept under observation during the entire period of their parasitic life, which is spent in the skin and subcutaneous tissues. The details of the technique of breeding, maintenance of larvæ, application to and observation in the skin, are too long for inclusion here and will be found in the fuller accounts referred to above.

Fifty-eight guinea-pigs, some imported and some local, were used for the series of experiments, and in all 1650 first instar larvæ were placed on the skin, observed to penetrate it, and thereafter kept under daily observation for a period of six consecutive days. Those larvæ which survived to the sixth day were classed as developing normally; this has the disadvantage of telling against our results, because some larvæ in semi-immune animals were able to survive till the sixth day, but proved unable to complete their parasitic life and died in the host animal; it has, however, the advantage that all larvæ could be accounted for, which we found would have been quite impossible in experiments on this scale if we had adopted the obvious method of collecting the larvæ as they emerged from their host proir to pupation.

The Production of Immunity.—Regarding our figures as a whole, the fact which primarily impresses us is that the first experimental infection with larvæ yields many more larvæ attaining to the sixth day of development than all the subsequent applications taken together. Thus of 472 larvæ placed upon the guinea-pigs at their first experimental infection—that is to say, at their first test—231 (49 per cent.) survived to the sixth day, whereas of 1178 larvæ put on at all the subsequent applications combined, only 78 (7 per cent.) survived to the sixth day. We found at the same time that the local guinea-pigs differed from imported English guinea-pigs in their resistance to the development of the larvæ; thus of 180 larvæ applied at the first test of local guinea-pigs only 60 (33 per cent.) developed, whereas of 292 larvæ applied at the first test of imported guinea-pigs, 171 (59 per cent.) developed. We see, therefore, that local guinea-pigs possess a relative immunity compared with imported animals and that both local and imported guinea-pigs acquire a great degree of immunity as a result of previous infection.

The Nature of the Immunity.—At the first we believed we were dealing with a general immunity affecting the whole animal body; this was a natural assumption from the figures we were obtaining, which showed a steady diminution of positive results in successive tests of the same animals; the steadiness of the diminution was due to part, as we shall show later, to the method of experimenting.

That we were unable to obtain any reactional evidence of the production of general immunity was, however, significant. For example, not only was the repeated endeavour to confer passive immunity by the injection of the whole blood of immune into non-immune animals entirely unsuccessful, but so also were all our attempts to demonstrate the presence of antibodies in the serum of immune animals. Complement-fixation and precipitin tests were negative; the whole blood and serum of immune animals possessed no larvicidal properties in vitro; whole blood defibrinated, and active and inactivated serum of immune animals were neither lethal to larvæ living in contact with them for several days, nor did their influence prevent the development of such larvæ in a normal manner when subsequently placed on non-immune animals. Corroborative evidence of the fact that antibodies in the general circulation play no easily recognisable part in this form of immunity was afforded by the results of attempts to immunise animals by the intraperitoneal and subcutaneous injection of third instar larvæ in the form of an emulsion. Three animals were inoculated by each route and tested after a suitable interval; in neither series was any degree of immunity acquired—in fact at the test of the three animals which had received intraperitoneal injections more larvæ developed than would normally have developed in untreated animals. It was striking therefore, in view of the above results, to see that not a single larva could develop at all out of 50 put on an area of skin on an immune guinea-pig, while of 50 similarly applied to an identical area of skin on a non-immune guinea-pig 30 developed normally.

Local Immunity.—We were led to the conception of the immunity as a local one by the fact that an animal which had proved at repeated tests to be immune on one skin area might yet permit the larvæ to develop at least partially on another area as yet not tested. This fact escaped our notice at first, because for the sake of convenience we were in the habit of using the same skin areas for repeated tests, and when the animal duly became immune in these tested areas, we thought of it as generally immune. Having been driven by our results to the idea of a local immunity, we continued our experiments from this point of view; the highly interesting and important conclusion was thereby reached that we were, in fact, dealing with an immunity which is at first localised to the site of larval development. In order to bring out this fact it is necessary to compare (1) the results of a series of tests of a number of animals on unselected skin areas with (2) the results of a series of tests of selected skin areas on the same animals. The figures for comparison are set out in the table from which it is seen that a series of tests of skin areas has the effect of producing a completely negative result after the sixth test, whereas a series of tests of animals on unselected areas gives irregular results. Thus it is seen that even the twelfth test of animals may give a result as positive as any but the first test. In addition to the conclusive evidence which the table affords of the production of local immunity, we have also here evidence that animals tested frequently in any area tend to become generally

Table showing that Repeated Application of Larvæ to the same Skin Area Results in Complete Local Imumnity.

Consecutive tests of animals.			Consecutive tests of skin areas in the same animals.		
No. of test.	No. of larvæ put on.	Percentage of larvæ which survived to 6th day.	No. of test.	No. of larvæ put on.	Percentage of larvæ which survived to 6th day.
1st	472	49	1st	614	43
2nd	194	12	2nd	215	10
3rd	156	6	3rd	210	4
4th	160	6	4th	160	1
5th	145	12	5th	132	5
6th	140	4	6th	117	3
7th	183	3	7th	133	0
8th	70	7	8th	41	0
9th	59	2	9th	18	0
10th	19	0	10th	6	0
11th	30	0	11th	4	0
12th	16	12			

immune, which is an indication that the immunity spreads.

Spread and Persistence of the Immunity.—Evidence of the spread and persistence of the immunity was obtained by direct experiment. Six animals were chosen which at their first test with 29 larvæ had a percentage of 62 surviving; at an interval of three months, after being rendered immune on certain regions, they were tested on new regions with 48 larvæ; of these only 10 per cent. developed.

The persistence of the immunity was tested on the same animals by applying larvæ to the previously immunised areas. At the first test, as we have shown, 62 per cent. of the larvæ applied underwent development; at the test at the same areas three months after they had been immunised only 2 per cent. developed out of 46 larvæ applied. It should be noted that during the intervening period the animals were kept carefully screened so as to avoid casual infection.

It seems clear, then, that the immunity established locally by previous infection spreads out from the original site of immunisation, and that it persists for at least three months; in all probability it lasts much longer, but the limits have not yet been determined by us. As would be expected, it was found that animals which had been immunised and were then exposed to repeated infection during a period of over seven months showed a more definite spread and a stronger persistence of the immunity.

Association of the Immunity with the Tissues.—We have enumerated the forms of experiment which were undertaken in order to prove, if possible, the association of the immunity with the general circulation; these experiments proved that there was very little, if any, such association recognisable by the usual tests. Now we may mention certain experimental findings which indicate a definite association of the immunity with the tissues. It was found that:—

1. Larvæ which penetrate an immune area of an animal are dead in the skin in the majority of cases within a period of 40 hours—i.e., at a time when they are still lying very superficially and are not yet in contact with the blood-vessels.
2. When a piece of immune skin was grafted on to an animal which was not immune, the grafted skin retained its immunity, and the surrounding skin of the non-immune animal developed immunity; conversely a graft from a normal animal developed immunity after being planted on an immune area.
3. Skin reactions when larvæ penetrate were not observed in normal animals; in immune and semi-immune animals skin reactions, swelling, and redness usually occurred on the areas previously treated; a reaction was observed to occur on the immune skin grafted on a non-immune animal.
4. The immunity is reproduced in the new skin which grows on a denuded portion of an immune area.

One series of experiments, however, shows that the skin may depend indirectly on the circulating fluids for its immunity. The immunity present in living skin did not persist in the same skin when detached from the animal, larvæ living in it at room and incubator temperature for as long as they did in normal skin also detached.

Eosinophilia.

Owing to the prominence which is often given to the occurrence of eosinophilia in many infections with metazoan parasites, we attempted to come to some conclusion as regards its significance in immunity to such parasites. In each case our percentage of eosinophils was derived from a count of a thousand leucocytes, and this part of the investigation involved the differential counting of nearly a hundred thousand leucocytes. The conclusions reached were as follows:—

(*a*) Metazoan infection is not invariably accompanied by eosinophilia.

(*b*) Immunity against a metazoan parasite may develop without the occurrence of eosinophilia, either general or local.

(*c*) Intense eosinophilia, either general or local, may exist without any immunity being present.

(*d*) Intraperitoneal injections of emulsions of third instar larvæ reduce the eosinophil percentage.

(*e*) Subcutaneous injections of, and applications to, the scarified skin of third instar larvæ as emulsions increase the eosinophil percentage.

Nature of the Immunity and its Production by Artificial Means.

It has been possible to exclude both mechanical damage to the skin and the condition of athrepsis as the cause of the immunity. Attempts to break it down, once it is established, by intraperitoneal injections of oil, by the administration of certain drugs, and by damage to the superficial layers of the skin have failed. We are, in fact, dealing with a true immunity against metazoan parasites, and it is a solid immunity. The remarkable phenomena brought to light by the work of Besredka on local immunisation in the realm of bacteriology may find a parallel in metazoan immunity.

Some preliminary experiments have been made on production of the immunity by artificial means. While intraperitoneal and subcutaneous injections failed to produce it, much greater success attended our efforts when we permitted larvæ to penetrate and then removed them; and again when we applied emulsions of larvæ to the skin. Of 12 animals treated by these means four developed immunity on the area treated, and the remaining eight in the majority of cases gave a much lower positive rate than normal.

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BLOOD-SUGAR CURVES IN CERTAIN MENTAL DISORDERS.

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THE carbohydrate metabolism has been investigated in 90 cases of mental disorder, in the hope that either a typical curve might be found correlating with any particular disorder or that some further light might be thrown on the pathology of the diseases.

Technique.

In this work the method of Calvert [1] has been used as being the most satisfactory.

A quantity of blood (about 250 mg.) is collected from a finger prick into a small platinum capsule and weighed on a torsion balance. It is immediately dropped into a tube containing 7·3 c.cm. of distilled water, and when hæmolysis has occurred 0·3 c.cm. of 2/3 N. sulphuric acid and of 10 per cent. sodium tungstate added. After shaking and allowing to stand for a few minutes, the blood proteins are completely precipitated, and the mixture is filtered through a starch-free filter paper. Five c.cm. of the protein-free filtrate (i.e., five-eighths of the original quantity) are pipetted off into a special tube and boiled for six minutes with 2 c.cm. of alkaline copper tartrate solution. Two c.cm. of phospho-molybdic acid reagent are added, the whole made up to standard volume (12·5 c.cm.) with distilled water, and the tubes shaken and set aside for the colour to develop fully. Instead of comparing this colour with that produced under the same conditions with standard glucose solutions, Calvert has introduced a fixed colour standard in glass with which the solution to be tested is compared by means of a colorimeter. He has also worked out a curve of correctives for copper reduction, thereby eliminating an appreciable error with high and low glucose concentrations.

In all the cases examined a meal of 50 g. of glucose in 8 oz. of distilled water was given, following a six hours fast, and blood-sugar levels were obtained at half-hourly intervals up to two hours.

[1] Calvert, E. G. B.: Biochemical Journal, 1924, xviii., 839.

Summary of Cases.

Ninety cases of mental disorder have been investigated and belong to the following types:—

Anxiety neurosis	50
Epilepsy	15
Melancholia—early agitated, late agitated, involutional, recurrent	25

The cases of anxiety neurosis have been drawn from the Out-Patients' Department for Nervous Diseases at Exeter, the Torbay Hospital, Torquay, or from private practice, and are uncertified. Clinically, the majority of these cases had physical signs of tachycardia, palpitation, and a systolic blood pressure of under 115. Mentally, they were over-anxious, hypersensitive, and hypochondriacal, often with some degree of phobia (Table I.).

TABLE I.—*50 Cases of Anxiety Neurosis.*

Case No.	Starvation level.	After glucose meal (hours). ½	1	1½	2	Case No.	Starvation level.	After glucose meal (hours). ½	1	1½	2
1	·09	·18	·23	·11	·07	26	·1	·13	·18	·2	·21
2	·08	·15	·18	·15	·16	27	·1	·13	·185	·185	·14
3	·07	·12	·17	·165	·16	28	·1	·135	·15	·15	·145
4	·095	·16	·195	·18	·13	29	·1	·155	·19	·2	·18
5	·1	·16	·2	·17	·14	30	·09	·13	·15	·16	·115
6	·1	·18	·19	·17	·14	31	·09	·19	·25	·14	—
7	·095	·145	·18	·165	·125	32	·09	·11	·13	·19	—
8	·125	·205	·27	·25	·23	33	·12	·19	·15	·16	—
9	·14	·22	·19	·155	·12	34	·12	·18	·2	·19	—
10	·1	·165	·175	·13	·11	35	·08	·15	·14	·15	—
11	·14	·165	·19	·18	·17	36	·09	·16	·22	·13	—
12	·18	·22	·26	·25	·25	37	·12	·22	·27	·15	—
13	·12	·195	·27	·2	·2	38	·095	·185	·21	·23	·185
14	·14	·155	·17	·15	·15	39	·12	·21	·27	·22	·18
15	·14	·145	·15	·14	·14	40	·1	·19	·22	·16	·12
16	·13	·14	·15	·15	·14	41	·175	·23	·22	·18	·12
17	·1	·11	·25	·14	·14	42	·1	·13	·175	·175	·175
18	·1	·125	·15	·16	·12	43	·08	·12	·165	·18	·16
19	·1	·165	·23	·17	·1	44	·11	·16	·19	·14	·09
20	·1	·155	·21	·34	·23	45	·105	·15	·2	·21	·19
21	·115	·205	·18	·115	·1	46	·14	·19	·23	·245	·16
22	·115	·155	·17	·14	·13	47	·08	·165	·18	·16	·18
23	·09	·115	·135	·12	·12	48	·12	·225	·3	·255	·15
24	·1	·14	·17	·2	·16	49	·1	·18	·215	·21	·17
25	·11	·18	·2	·17	·135	50	·11	·19	·205	·165	·155

From this table it will be seen that the starvation level is within normal physiological limits in 35 of the cases, and is above this limit in the remaining 15. All show an appreciable rise of blood-sugar values after half an hour, though there is considerable variation in the resulting hyperglycæmia. One hour later only 4 cases show any tendency to fall, and there is an increase in sugar values in every other case; many of these readings are high and markedly above normal. One and a half hours later 13 cases are still rising, 4 remain at the level reached half an hour previously, and the rest show the intervention of the storage mechanism. At the end of two hours only 6 cases have regained their fasting level, and many still show high values.

TABLE II.—*15 Cases of Epilepsy.*

Case No.	Starvation level.	After glucose meal (hours). ½	1	1½	2	Case No.	Starvation level.	After glucose meal (hours). ½	1	1½	2
1	·12	·19	·21	·24	·16	9	·11	·155	·13	·13	—
2	·14	·19	·23	·245	·16	10	·12	·12	·12	·11	·12
3	·11	·15	·245	·185	·11	11	·09	·14	·135	·09	·08
4	·11	·14	·12	·105	·105	12	·125	·185	·14	·11	·09
5	·1	·17	·23	·195	·16	13	·1	·14	·1	·11	·09
6	·09	·13	·13	·1	·09	14	·095	·14	·15	·15	·125
7	·11	·15	·19	·16	·12	15	·105	·15	·2	·21	·19
8	·1	·17	·12	·12	·1						

Fifteen cases of epilepsy were investigated. All were subject to major attacks, and were on luminal treatment at the time of investigation. They were drawn from the same source as the cases of anxiety neurosis, and were all uncertified (Table II.).

These cases show a wide variation in their curves, only 5 appearing to be justifiably counted as normal in their reaction to the glucose meal. After half an hour all but one give evidence of an appreciable rise, which is maintained or increased in all cases except 6. In 8 cases the values are reduced at the end of an hour and a half, but few have reached their starvation level point. Two hours after the meal 7 cases show higher values than at the commencement of the test.

Twenty-five cases of melancholia were investigated and have been divided into four groups clinically:—

(*a*) Early agitated melancholia, in which the disease had lasted only three or four months and was not apparently associated with the climacteric.

(*b*) Late agitated melancholia, in which the symptoms of agitation had lasted over a year, and in some cases up to five years.

All the patients belonging to these two groups were under certification (Tables III. A and III. B).

TABLE III. A.—*6 Cases of Early Agitated Melancholia.*

Case No.	Starvation level.	After glucose meal (hours). ½	1	1½	2
1	·2	—	·11	·14	·19
2	·18	—	·12	·15	·1
3	·12	—	·1	·13	·11
4	·12	—	·09	·13	·1
5	·11	—	·09	·14	·1
6	·11	·179	·18	·18	·12

TABLE III. B.—*5 Cases of Late Agitated Melancholia.*

Case No.	Starvation level.	After glucose meal (hours). ½	1	1½	2
1	·07	·12	·18	·13	·11
2	·08	·1	·12	·16	·07
3	·07	·12	·17	·17	·09
4	·08	·11	·15	·11	·08
5	·07	·11	·15	·11	·11

In Table III. A. all show evidence of defective blood-sugar regulation.

In Table III. B. all show a definite degree of hypoglycæmia in the starvation level, but are comparatively normal in their reaction to the glucose meal.

(*c*) Involutional melancholia, in which the depression was apparently associated with the climacteric, and was accompanied by bouts of vaso-dilatation, menorrhagia, or amenorrhœa.

(*d*) Recurrent melancholia (manic-depressive psychosis). All except 2 of these cases were certified, and the tests were carried out during an attack of depression (Tables III. C and III. D).

TABLE III. C.—*7 Cases of Involutional Melancholia.*

Case No.	Starvation level.	After glucose meal (hours). ½	1	1½	2
1	·12	·17	·15	·13	·09
2	·10	·16	·19	·16	·11
3	·12	·18	·18	·15	·13
4	·08	·11	·15	·15	·25
5	·08	·11	·15	·19	·12
6	·08	·13	·19	·28	·23
7	·09	·12	·16	·18	·21

TABLE III. D.—*7 Cases of Recurrent Melancholia.*

Case No.	Starvation level.	After glucose meal (hours). ½	1	1½	2
1	·1	·13	·16	·15	·11
2	·12	·17	·22	·22	·22
3	·11	·13	·16	·13	·11
4	·2	·21	·22	·2	·18
5	·1	·13	·16	·15	·07
6	·08	·11	·13	·19	—
7	·13	·155	·21	·19	·1

In Table III. C. the starvation levels are within normal physiological limits, but there is a tendency towards sustained high values.

In Table III. D. the starvation levels are within normal limits, and only three cases fail to return to their original value. There is a tendency to reach high levels during the course of the meal.

Conclusions.

From the above results it will be apparent: 1. That there is no characteristic curve for any of the disorders investigated. 2. That in anxiety neurosis, however, a failure to return to the original starvation is present in 87 per cent. of the cases. 3. This failure is in all probability accounted for by a mobilisation of blood-sugar to counteract some toxic process, or by a partial suppression of the pancreatic hormone induced by a similar process. 4. It would appear

unlikely that the symptoms of mental anxiety are the primary cause of the high levels reached during the meal, as practically none of the cases showed a high starvation level indicating excessive action of the thyroid-adrenalin system prior to the ingestion of the glucose. 5. In the cases of epilepsy and melancholia investigated, an apparent defect in carbohydrate metabolism is present. 6. The irregular types of curve obtained in certain cases of melancholia are in all probability due to a lack of balance in the endocrine system, as considerable improvement in the mental reaction and type of curve has followed thyroid and adrenalin treatment.

I should like to take this opportunity of thanking Dr. Porter Phillips for his courtesy in allowing me to carry out part of this work at Bethlem Hospital; and also Captain Mann, of the Maudsley Hospital, for his kindness and help.

Clinical and Laboratory Notes.

NOTE ON AN ADDITION TO THE REHFUSS STOMACH-TUBE.

BY E. M. WATSON, M.D. WEST. ONT., M.R.C.P. EDIN.,
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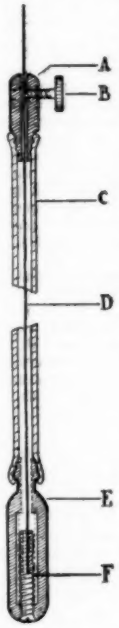
IT is the experience of those who use the fractional method of gastric analysis that many patients have difficulty in swallowing the Rehfuss or Ryle type of stomach-tube. Owing to the flexibility of the rubber, little or no assistance can be afforded to the passage of the instrument through the pharynx and down the œsophagus. It frequently happens, therefore, especially in patients unaccustomed to the use of a stomach-tube, that it tends to coil up in the mouth or pharynx, giving rise to excessive secretion of saliva and much unpleasant retching. The passage of the tube is completely resisted in the unconscious or non-coöperative patient.



To obviate these difficulties various modifications of the original model have been devised, whereby a degree of rigidity is provided, the tube and its passage thereby facilitated. The one described, shown in the accompanying diagram, has been tried and its usefulness proved.

The tip, E, is essentially the Rehfuss "olive," but has been made somewhat longer and narrower than this. Projecting into it from below is a hollow screw, F, which allows a brass wire, D, 1 mm. in diameter, to pass into it. The wire is contained within the lumen of the rubber tube, C, at the proximal end of which is a small brass attachment, A, through which the wire passes and which possesses a set-screw, B, by which the wire may be secured.

Before inserting the wire a few drops of a liquid lubricant (e.g., lubafax, Burroughs and Wellcome) should be instilled into the tube by means of a medicine-dropper. This allows easy insertion and withdrawal of the stylette. The end of the wire is directed into the cavity of the screw in the tip of the stomach-tube, the rubber is stretched slightly over the wire, and the set-screw tightened. The wire is thus fixed in position and the instrument can be conducted into the œsophagus. When the lower end reaches the stomach the metal attachment is removed and the stylette withdrawn.

UNUSUAL CASES OF POLIOMYELO-ENCEPHALITIS.

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THE following four cases seem worth recording because of their unusual symptoms. Similar instances are rare in the literature, though they occur during epidemics of poliomyelitis.

CASE 1.—A boy, aged 21 months, was admitted to hospital with a history of vomiting, convulsions, and loss of sight for the previous week.

On examination he was found to be quite blind. He had an internal strabismus and a constant upward and downward slow movement of the eyelids and eyeballs, too slow to be called nystagmus. There was rigidity of the back and neck and some head retraction. The reflexes were normal and there was no paralysis of the muscles. The optic discs were normal. The temperature was 104·6° F. and the pulse rapid. The cerebro-spinal fluid was under high pressure but was otherwise normal.

The acute symptoms passed off in a few days and the sight gradually returned. Recovery was associated with much mental irritability At the end of two months the child was discharged still weak in his legs but otherwise normal. The mother reported, two months after discharge, that the boy's temperament was changed since the illness. Previously he had been a quiet boy but now he was irritable and subject to violent screaming attacks at any time of the day or night.

CASE 2.—A girl, aged 20 months, was admitted to hospital with a history of vomiting and stiffness of the back and neck for two days.

On examination she was flushed and apparently unconscious of her surroundings. The eyes were half open and the pupils dilated. She seemed unable to cry even when disturbed. The temperature was 101·6° F. The knee-jerk was absent on the left side and the left leg was weaker than the right, but there was no definite paralysis or pain in the limbs. The urine contained a faint trace of albumin. The optic discs were normal. The cerebro-spinal fluid was under pressure but otherwise normal.

For about a fortnight the child ran an irregular fever, which gradually settled down. The stiffness of the back and neck wore off, but it was four weeks before the girl could sit up. During the period of recovery she became very irritable. She was eventually discharged apparently normal in every way.

CASE 3.—The patient was a boy aged three and a half years. For five days before admission he had been unable to walk and had been irritable, complaining of pains in the back and limbs. On admission he was very fretful and complained of headache, pains in the limbs, and much stiffness of the back and neck. The temperature was 99·6°. The knee-jerks were absent and Kernig's sign was present. The arm reflexes were with difficulty obtained. The optic discs were normal. The cerebro-spinal fluid was under considerable pressure and contained 0·3 per cent. albumin. Four days later the child was unable to raise the left arm owing to paresis of the left deltoid muscle.

He remained in hospital for about six weeks and steadily improved. The weakness of the deltoid slowly passed off but he was left with an intention tremor, most marked in the hands, closely resembling that of paralysis agitans. He also became very emotional and remained so until discharge.

CASE 4.—A girl, aged 3 years and 8 months, was admitted to hospital complaining of lethargy, almost amounting to coma, associated with marked stiffness of the back and head retraction. Three days previously there had been a sudden onset with temperature of 101°, pains in the limbs, and lethargy.

On examination she was stiff in the back and cried when touched. Kernig's sign was present. The optic discs were normal and the knee-jerks were obtained. After admission the temperature fell almost at once and she rapidly improved, being discharged as normal three weeks later.

These cases have been called poliomyelo-encephalitis, although, if F. E. Batten's classification[1] is followed they should be described as poliomyelitis of the midbrain and meningitic types. In none of them, however, were the symptoms confined to those of one type. Case 1 is the best example of a definite type as most of the symptoms can be located in the midbrain—e.g., the blindness and eye movements. In Case 3 the subsequent tremor was the

[1] Lumleian Lectures, vide THE LANCET, 1916, I., 809.

only symptom of midbrain lesion. All the cases showed stiffness of the back and other meningitic symptoms, and several showed by their subsequent mental deterioration that the higher centres had been attacked as well.

All four cases were admitted acutely ill, two of them being unconscious. This is unusual in poliomyelitis where the initial illness is often mild, sudden, and of short duration. The diagnosis was difficult and had to be made from meningitis and encephalitis lethargica. Examination of the cerebro-spinal fluid excluded the former. To exclude the latter was more difficult as encephalitis lethargica in its onset may present varying manifestations from slight headache to complete coma. This difficulty arose particularly in the first case, but the general aspect was that of meningeal irritation associated with certain midbrain lesions such as blindness, which is almost unknown as an early symptom of encephalitis lethargica.

The outlook in this type of case is good, judging from the above instances, though the acuteness of the onset and the possibility of subsequent mental defects should make the prognosis very guarded. The treatment is largely symptomatic. Lumbar puncture is useful in relieving pain and stiffness of the back. This is rational as the cerebro-spinal fluid always appears to be under considerable pressure.

Such cases as those described are not common, but should be recognised as varieties of poliomyelitis.

I should like to thank the medical staff of the Hospital for Sick Children for allowing me to publish them.

A CASE OF ACUTE INFECTIVE OSTEOMYELITIS TREATED BY CONSERVATIVE METHODS.

BY HERBERT H. BROWN, O.B.E., M.D. LOND., F.R.C.S. ENG.,
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IN some cases of acute osteomyelitis of a long bone the whole of the periosteum covering the diaphysis is separated by suppuration, accompanied by purulent infection of the bone-marrow. In such cases treatment by the usual surgical methods is generally followed by necrosis of the major part, if not the whole, of the diaphysis; a large sequestrum is formed, surrounded by an involucrum of rough and irregular new bone, and this has to be removed by a second operation after a somewhat prolonged period of suppuration. The final result is generally a useful but somewhat unsightly and clumsy-looking limb, the shaft of the bone being thickened and irregular.

It appeared to me that it might be possible to prevent necrosis of the diaphysis, with the subsequent formation of new bone and the resulting thickening and deformity, by a thorough disinfection of the bone, the object being to allow the original diaphysis to remain and function. I attempted this five years ago with a very considerable measure of success.

A boy, six years old, was admitted to the East Suffolk Hospital in June, 1921, on a Wednesday. He had fallen on the preceding Thursday and bruised the left tibia. Two days later the limb had become inflamed and very painful, and he had been kept in bed, treated with lotion, &c., for five days before his admission to hospital. On admission he was very ill; temperature 105° F., pulse-rate 160, the left leg very much swollen, red, and acutely tender. There was no sign of involvement of knee- or ankle-joints.

Operation.—A free incision was made along the whole extent of the inner surface of the shaft of the tibia. The whole of the diaphysis was found to be bathed in pus, and the periosteum separated everywhere. The pus was freely washed away, the surface of the bone and periosteum was thoroughly scrubbed first with gauze soaked in 1 in 20 carbolic lotion, then with methylated spirit, and finally with ether, and packed off with gauze; the shaft of the bone was then opened freely for the whole length of the medullary cavity. The medulla, which was infiltrated with pus, was cleared away, and the cavity of the bone cleaned in a similar manner with carbolic lotion, spirit, and ether. Slips of gauze soaked in bipp were placed between the periosteum and the bone and the cavity was also stuffed with gauze soaked in bipp.

On the following day the temperature fell to normal, and all œdema, redness, and tenderness had disappeared. The gauze packing was removed after three days. The diaphysis retained its vitality and no involucrum was formed around it. There was, however, a little infection remaining in the cancellous tissue at the upper end of the medullary cavity, causing slight fever for several weeks, and leading eventually to the separation of a small sequestrum about three-quarters of an inch in length and about a quarter of an inch in its widest part.

A culture of *Staphylococcus aureus* was made from the pus and a vaccine administered for several weeks.

At the present time the leg appears normal externally except for the operation scar. A radiograph shows that the tibia is also normal in structure, and that there is no thickening or deformity.

A CASE OF TRIGEMINAL NEURALGIA.

BY J. W. LLOYD, M.R.C.S. ENG., L.D.S. R.C.S. EDIN.,
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THE means of treatment adopted in the following case of obstinate trigeminal neuralgia may be of interest. I had occasion recently to look up my notes of it because a fellow practitioner inquired how I had secured relief for the patient.

On July 9th, 1923, the patient came to me, sent by his medical man, presenting the usual alarming and distressing symptoms of trigeminal neuralgia. He was edentulous and over middle age. The patient, who occupied an important commercial position, had been suffering for some months, and during the periods of attack had been completely prostrate and unable to attend to his business.

I need not enumerate the symptoms as they are well known to any who have had the treatment of any such cases. The attacks came regularly each evening and were started on the slightest provocation, such as a cold draught of air or the banging of a door. Treatment of similar cases with drugs and applications had never ended satisfactorily in my experience and had usually ended with injection of alcohol in the Gasserian ganglion or even with its removal. As the pain started in the lower jaw, I commenced my treatment of an injection of 10 minims of a 2 per cent. solution of novocaine into the right mental foramen. I was far from sanguine from previous experience that any treatment would cure him, but as he gained some relief I repeated the injection on the following day and then again two days later. He had so much relief from these injections that I told him not to come again until he felt any return of the pain. He expressed himself as greatly benefited and said that he felt that I had got to the seat of the trouble. His relief was so great that he begged me to accept double my fee.

I made him a new set of dentures, thinking it possible that a redistribution of the pressure on the alveolus of the lower jaw would be desirable, his old case fitting not at all badly but pressing a little more if anything on the side where the trouble originated. He assured me that his old dentures did not hurt him and that the pain was irrespective of wearing them or not. When he reported that the dentures were quite comfortable he left me, and I heard no more of him until March 28th, 1927, when I was informed that he had had no recurrence.

I have not found that cutting away the alveolus at the spot in which the pain originates gives more than temporary relief. Any experienced person is, of course, anxious to avoid severe surgical treatment, and to any practitioner who has a case of trigeminal neuralgia which is proving intractable I beg to suggest that the treatment described should be tried before injections of alcohol into, or removing, the Gasserian ganglion—a difficult and dangerous operation.

WHISKY AT A HOSPITAL.—At the last meeting of the Galway Hospitals Committee the medical staff called attention to the fact that during the preceding month the bill for stimulants, chiefly whisky, consumed in the hospital was £25, while poultry cost only £15. "These amounts were unusually large." One "part-payment" patient consumed £2 6*s.* 10*d.* worth of gin in the month. A member of the committee stated that up to little more than a year ago the bill for stimulants amounted to £100 a month, but that it was now usually £10 or £12 a month. The matter is to be considered by the Economy Committee.

Reviews and Notices of Books.

THE INFLUENCE OF MUSIC ON BEHAVIOR.

By CHARLES M. DISERENS, Assistant Professor of Psychology, University of Cincinnati. Princeton: Princeton University Press. London: Humphrey Milford, Oxford University Press. 1926. Pp. 224. 11*s.* 6*d.*

THIS book must have entailed a heavy amount of work upon its author; the bibliography covers 12 pages. But most of the contents are a résumé of results obtained by previous observers, and the original contributions—such as the experimental studies contained in Chapter VIII.—do not seem to us to have any material scientific value. Everybody knows that rhythmical music has an advantageous effect upon muscular exercise—building, rowing, getting up an anchor by hand, marching, and so on—especially when these exercises are performed by a multitude of workers acting together, for the rhythm keeps the individuals together and helps them individually and collectively. Everyone knows that troops march more easily and with less fatigue if they are accompanied by a band or if the men themselves sing a marching song adapted to the rhythm of the footsteps. Anyone should march well to the magnificent folk tune called High Germany which is in common time, but it would be difficult if not impossible to march to a curious movement however beautiful—say, a movement in 5/4 time such as appears in Tchaikowski's Fifth Symphony.

Prof. Diserens has made a number of elaborate experiments upon college pupils as to fatigue and endurance, accuracy of movement, speed of movement, effect of music on speed, size, form and character of handwriting, together with a study of the effect of single chords on the same element of handwriting, and also the effect of music on voluntary and involuntary reactions. The music consisted of records played upon an Edison phonograph and the items played seem to have been mostly of a trivial character; he notes that the majority of a class of 150 students of psychology declared depressive a song called "I'll take you home again, Kathleen." The experiments suggested that music accelerated respiration, a result which can hardly have been expected. Surely the tendency, at any rate if good music is in question, is towards a slowing of the respirations, and this fact may be noted by watching the respirations of a neighbour during a performance. One of the subjects upon whom the experiments were made had a normal respiratory rate of only 8·3 per minute, while three others had rates of 19 and upwards respectively, so that uniform results could not have been anticipated.

Prof. Diserens's ideas of what constitutes music are wide. In the research to show how musical stimuli affect handwriting the "music" was the following: "the chord C E G D was sounded as low on the scale as possible; after five minutes the same chord was repeated as high on the scale as possible; a piano was used to produce the chord which was sounded repeatedly during the writing." We learn that the results of the experiment were almost entirely negative, but why such a discord as a tonic major ninth should have been selected we do not understand.

As a collection of results observed and recorded by many workers in various fields the book is interesting, and we thank the author for the story of the lobster—"a lady's pet in Paris, said to be so fond of music that it was always drawn to the piano whenever its mistress played." If Lewis Carroll had only known this we might have had another verse to the immortal lobster song, thus:—

"'Tis the voice of the lobster
I hear him complain,
You have played it all wrong
You must play it again."

THOUGHT AND THE BRAIN.

By HENRI PIÉRON, Professor at the Collège de France. Translated by C. K. OGDEN, Editor of *Psyche*. London: Kegan Paul, Trench, Trübner and Co., Ltd. 1927. Pp. 262. 12*s.*

IN his preface the author enunciates with approval an aim of science as "the correlation of psychological facts with physiological mechanisms, neglecting the subjective aspect of consciousness." A reader who regards thought as essentially a subjective process associated with consciousness will be puzzled by this limited definition in a book entitled "Thought and the Brain." The work is devoted almost entirely to a full and well-documented description and discussion of the physiology and pathology of the central nervous system, especially in regard to cerebral localisation as revealed by disease or injury, and to this extent has an unquestionable value. But the writer, while setting out to explain mind in terms of neurology, leaps from the known to the unknown in most disconcerting fashion. In the midst of a chapter on localised lesions of areas serving the verbal function he refers (p. 180) to an aphasic war patient with amnesia who could name an object and yet was unable to repeat its name when asked. This hysterical prank is seriously attributed to a "functional injury" debarring the mechanism of evocation by associated paths, and the author discusses the fantasy as if it were an anatomical observation. A similar pitfall for the reader is found on page 70, where, after describing the spinal innervation of the pre-axial and post-axial halves of each limb, Mr. Piéron gives a reference to a case, described in 1894, in which there was a transfer of localisation from one half of the limb to the other; he gives no hint that in the original account was described a host of hysterical symptoms that suggest strongly in the light of Babinski's teaching that the altered sensation was a hysterical phenomenon induced by suggestion. If the author wishes to maintain that hysterical symptoms are due to "functional injury" he owes it to his readers both to define the term and to let them know what they are reading about. Amongst "data of affective pathology" we read that ". . . . in most cases of insanity. . . . essentially there is only a disturbance of the tendencies, an injury to the affective area. . . . ." and this declaration is so closely associated with pathological observations that the reader may again be unwittingly involved in metaphysics. The author is unkind to the behaviourists, who take for their motto "Give me a nerve and a muscle and I will make you a mind," but the addition of cerebral structures to the recipe scarcely alters the philosophical position.

As a summary of work on localisation, including that of Head on aphasia and of Gordon Holmes on visual centres, the book should be welcome to neurologists, but to the clinical psychologist it will bring disappointment.

NERVES, MASTER-SYSTEM OF THE BODY.

By DAVID FRASER-HARRIS, M.D., D.Sc., F.R.S.E. London: Faber and Gwyer, The Modern Health Books. 1927. Pp. 222. 3*s.* 6*d.*

IT is a truism, as the introduction states, that people speak of their "nerves" without having the faintest idea of what the nervous system is, though we might also have been told that they talk similarly of stomach, heart, kidneys, with identical ignorance. The author feels it worth while to replace such ignorance by a little knowledge, evidently not believing that bliss is preferable. Accordingly, the reader is introduced, in as simple language as circumstances permit, to the mysteries of neural conductivity, reflex action, cerebral function, decerebration, physical bases of consciousness, and so forth, in an interesting enough fashion; nor is there any pause to consider whether all this can be comprehended of the multitude, although the student of medicine knows well how long his art is and how many years are requisite for the accumulation of theoretical knowledge. Short chapters on nervousness and the maintenance of neural health

conclude the book. Incidentally, we are told that the health of the nervous system is made or marred in the first seven years of life, and that children of the nervous type ought not to be taught to read till they are about eight years old. We find ourselves wondering whether attention to these dogmatisms will result in the disappearance of nervousness in the coming generation, or whether it is possible their importance is overrated. Dr. Fraser-Harris has endeavoured to lighten the task set the lay reader by the introduction of apt verbal illustrations and by a few diagrams.

NEUROLOGY AND PSYCHIATRY.

Précis de Sémeiologie Neuro-psychiatrique à l'Usage des Praticiens. By Dr. A. ROUQUIER, Professeur ágregé du Val-de-Grâce. Paris: Gaston Doin et Cie. 1927. With illustrations. Pp. 272. Fr. 32.

THE twin sciences, neurology and psychiatry, cover between them so large a field of medical knowledge that any effort to present a compendium embracing both is faced with obvious difficulties at the outset. Dr. Rouquier's attempt is to be judged on its merits. Some 200 pages are devoted to the semiology of motor and sensory systems (and it is surprising how much of neurology can be comprised under these simple headings), and some 70 to psychiatric syndromes, included under the equally simple titles of constitutional psychopathic states, acute mental disorders, and chronic mental disorders. Various of the author's descriptions are sketchy and consequently rather uninforming; others we consider are almost misconceived. For example, to group the forms of torticollis under diseases of the basal ganglia indicates failure to appreciate the diametrically differing pathogeneses of the clinical varieties of that syndrome: Thomsen's disease and writers' cramp, are both, it is hinted, possibly of basal ganglionic origin—in fact, Dr. Rouquier does not hesitate to give the overworked corpus striatum the responsibility for a number of dissimilar motor disorders whose objective pathology still escapes us. The sections on psychiatry follow the teaching of the French school and offer the reader a somewhat one-sided presentation.

THE MODERN MENTAL HOSPITAL.

By ROBERT HUNTER STEEN, M.D., F.R.C.P. Lond., late Emeritus Professor of Psychological Medicine, King's College, London, and late Medical Superintendent of the City of London Mental Hospital, Dartford. London: Methuen and Co., Ltd. 1926. Pp. 115. 6*s*.

Dr. Robert Hunter Steen died in July of last year at the early age of 56, after 20 years' service as medical superintendent of the City of London Mental Hospital and a professional lifetime devoted to the mentally afflicted. His outstanding quality was a rare genius for friendship, which he used to explore the minds of those whose chief trial is the lack of friends, and to discover their needs and the methods by which to fill them. He succeeded as no one who relies chiefly on his intellectual gifts can succeed in this class of work, and his mastery of the psychology of the border-line case, that most difficult of all the problems of psychiatry, was admitted generally to be without equal. A few months before he died he commenced a book in which his object was threefold. First, he desired to strengthen true brotherhood between those who could hold their own in the world and those whose minds were unequal to the struggle, between which classes it is now recognised that no line can be drawn whatever except the fortuitous one of the hospital boundary. Secondly, he desired to tell the public the intimate facts of the life of patients in mental hospitals, their surroundings, their treatment, and their prospects. Thirdly, he desired to bear witness to the magnificent qualities possessed by mental nurses, a profession about which few people unacquainted with mental hospitals know much. Although the book was cut short by his last illness, he has amply succeeded in his aims. His first chapters describe a walk round the hospital with some friends to whom he is showing the sights: the workrooms full of contented, busy and normal-looking patients, the bright theatre and dining-room, the up-to-date laundry, the well-stocked farm. He then talks of the patients themselves, of the difficulties of certification, and the simplicity of release, of the excellence of the voluntary system. He writes clearly and well about the principles of treatment, but is obviously at his happiest when describing the parties, outings, and entertainments of which he was such a fertile inventor, and the patients' delight in them. His appreciation of the nursing profession is probably the best thing in the book. "I have seen them kicked, pummeled, their faces scratched, handfuls of their hair plucked out by the roots, their dresses rent from their backs, their caps and aprons torn to tatters, and yet I have never seen any loss of temper on their part. From their none too extensive stocks I have known them give presents of money or articles of jewellery or wearing apparel to some overjoyed patient. When off duty they have taken patients at their own charges to do some shopping, or to a tea-shop, cinema, concert, or theatre. Is it surprising, then, that we who know all these things, when we see aspersions printed about our nurses, are indignant?"

Few writers have ever explained the mental hospital to laymen, and certainly none has ever done it better. At a time when the prevention and treatment of mental disease is becoming a more and more urgent problem, the value of a book like this cannot be over-estimated.

EMERGENCY SURGERY.

Dringliche Operationen. Second edition. By Prof. D. ALEXANDER TIETZE, of Breslau. Stuttgart: F. Enke. 1927. Pp. 872. M. 33.

THE bulk of this text-book of emergency surgery is written by Prof. Tietze, but other surgeons have contributed chapters as follows: anæsthesia, K. Scheyer; infusion and transfusion, Rudolf Reichle; abscess of the brain and meningitis, Hugo Hauke; ophthalmic surgery, George Lenz; nasal surgery, Max Goerke; kidney function estimation and some other urinary work, Willi Hirt; gynæcology, Robert Asch; lumbar puncture, Konrad Tietze. The result is a large, carefully compiled treatise on urgent operations, including some operations which can scarcely be designated as urgent. The student will find good accounts of any branch of surgery he likes to turn up, whilst the experienced surgeon will appreciate the documented reviews of such subjects as gangrene and septic joints, which are not as a rule presented succinctly in text-books of surgery. Useful hints are included as to technique and methods with which the English surgeon is not familiar; for instance, the passage of a stomach-tube with an inflatable ball, which blocks the cardia before administering a general anæsthetic in intestinal obstruction. All the sections are not equally good, but the book can be recommended as a sound and reliable guide to emergency surgery.

THE CONQUEST OF DISEASE.

By THURMAN B. RICE, A.M., M.D. New York: The Macmillan Co. 1927. Pp. 263. 20*s*.

THE large title of this book is explained in the preface by the three purposes which the author has had before him, and these, in abbreviated form, are as follows: To set forth the most recent scientific information so that transmissible diseases may be controlled or eradicated; to make the subject interesting to the general reader; and to emphasise the great advances made by science. So many books, the author admits, have been written upon this and related subjects, that he has felt considerable reluctance in presenting another, and while candour suggests that there is not much in this presentation of well-known facts that will enlighten men of science, reference to the author's second object may be held to excuse the banalities. Dr. Rice has certainly been able to tell the story of many of the most important

transmissible diseases in a form that will be intelligible to the public, and one, moreover, which should help them to recognise the grounds on which the various scientific means are adopted for their control. The book is readable throughout, and admirably printed; it should have a large circulation and be useful to readers of all sorts, given a good standard of general education.

THE HUMAN BODY.

By TREVOR HEATON, M.D. London: Chatto and Windus. 1927. Pp. 250. 7*s*. 6*d*.

THIS book is one of the Simple Guide Series, where the various volumes have the common object to arouse interest in subjects of vital importance which, when treated scientifically, are hedged about as a rule with technicalities forming insurmountable obstacles for the general reader. Dr. Trevor Heaton has written here an excellent survey of the principles of anatomy and physiology and, assisted by clearness of diction, a well-planned synopsis, and many pertinent illustrations, has been able to tell a long and complicated story with remarkable brevity while maintaining interest throughout. It is a tribute to the balance of the book that we cannot point to any one particular chapter as being fuller or less adequate than another, and an educated reader should be able by careful perusal to arrive at a very just view of the fundamentals of human life. One of the closing chapters, which deals with such tremendous topics, among others, as "biology and the future," "racial degeneration," "prevention and cure," and "man and the universe," seems condemned by its contents to be a mass of generalities, more or less assimilated and correlated; it is, as a matter of fact, a perfectly coherent essay in which the philosophy of medicine, never alluded to as such, informs every page.

PUNISHMENT AND PERSONALITY.

By HAROLD BEGBIE. London: Mills and Boon, Ltd. 1927. Pp. 126. 5*s*.

THIS sketch of modern English prisons, the result of a tour of the penal institutions made at the instance of the *Daily Mail*, contains a great deal of interesting information sanely put; a real sympathy for the prisoners is never made doubtful by any sentimentality, and the character sketches of the inmates and their guardians, from the governor downward, are drawn with a thoroughly observant pen. In the last chapter, in which the personality of the criminal is analysed, the author writes ambitiously, but this section of the book, which might easily have run off into clap-trap psychology or misplaced pathos, is a well-balanced essay written in accordance with the author's own warning to his readers that they should regard the State-inflicted punishment for law-breaking not as an attempt towards either a medical cure or spiritual discipline. The result of his visits has led him to the opinion that our prison system, though in many ways praiseworthy, has yet far to go, and with this view most medical men will be in accord, and especially those associated with the Prison Service.

EDMUND BURKE.

By BERTRAM NEWMAN. London: G. Bell and Sons, Ltd. 1927. Pp. 348. 8*s*. 6*d*.

Mr. Newman has written an admirable biography and one that wanted writing. Burke was amongst the greatest statesmen at the end of the eighteenth century when persons of pronounced genius and persons of equivalent imbecility conducted our State affairs. We were engaged in international struggles of the most urgent and far-reaching sort, and in this country, leaders, notably Burke, were absorbed in vast political considerations, yet it is a singular comment on the time that a man of such learning, wide sympathies, and profound eloquence—our greatest political philosopher—seems never to have taken any active part in legislation for the amelioration of the social and sanitary conditions whose horrors he so constantly deplored. The connexion, for example, between the Gordon riots, despite their religious surface, and the bestial circumstances in which many of the rioters lived seems to have occurred to no one in authority, and to have been voiced only by philanthropic private individuals. There seems to be no authentic account of Burke's illness, which ended his life when he was 66, a fairly good age 130 years ago, but none the less an untimely one, when unaccounted for by any life-history. We know that he was so severely ill for over a year, as to be unable to attend to his literary work, but in the "Dictionary of National Biography" it is said that his disease "was found after death to have been internal abscesses."

INORGANIC PLANT POISONS AND STIMULANTS.

Second edition. By WINIFRED E. BRENCHLEY, D.Sc., F.L.S., Rothamsted Experimental Station. Cambridge: At the University Press. 1927. Pp. 134. 10*s*. 6*d*.

THE significance to the welfare of the animal organism of traces of certain food constituents is paralleled in plants; the presence or absence of traces of inorganic salts may have a profound influence upon growth and development. Since the publication of Miss Brenchley's book on this subject in 1914 a good deal of fresh evidence has been accumulated with regard to the significance of the elements boron and manganese. As to the former, it appears that, though toxic in higher concentrations, a small quantity of the element is in some leguminous plants—especially beans—as essential for healthy development as any of the more abundant elements generally recognised as nutritive in function, while peas, curiously enough, grow to maturity and ripen viable seeds in the entire absence of boron. As to manganese, small quantities appear to cause a very general stimulation of growth, but it is not yet so clearly established that manganese is essential to the life of the plant. The book contains a bibliography which may be profitably consulted by those in search of first-hand information.

DISEASES OF ANIMALS IN RELATION TO MAN.

By THOMAS W. M. CAMERON, M.A., B.Sc., Ph.D., M.R.C.V.S., London School of Hygiene and Tropical Medicine. London: Faber and Gwyer, Ltd. 1926. Pp. 222. 3*s*. 6*d*.

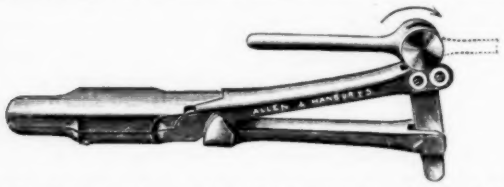
THIS book is an addition to the series of The Modern Health Books edited by Prof. D. Fraser Harris, who states in the introduction that the series is designed to bring within reach of everyone the latest expert opinions on the chief problems of health. He adds with regard to the present volume that "there has not hitherto been written a book precisely similar to this one—a concise discussion of those morbid conditions which are common to men and animals, and on the understanding and control of which so very much of our comfort, health, and prosperity as a nation depends." The author has certainly succeeded in presenting a large amount of valuable information on technical subjects in a form that can be readily understood by the lay reader, and the book should appeal to a wide public, including the medical and veterinary professions.

The introduction is taken up with a brief discussion of the general processes of infection and resistance. Tuberculosis in animals and the problems of animal tuberculosis and human health is given a prominent place. Other infectious diseases such as anthrax, glanders, rabies, small-pox and cow-pox, foot-and-mouth disease, and diseases of pigs are discussed. An interesting chapter is devoted to animal parasites and fungi. Milk in relation to human health is the subject of one of the longer chapters. Diseases of birds are discussed separately, as is also meat and meat poisoning. Brief mention is made of numerous diseases which are chiefly confined either to man or to animals, and the wide range of the subject matter makes the book a useful source of information, quite apart from its value as a treatise on public health.

New Inventions.

ABDOMINAL CRUSHING CLAMPS.

IN order to obtain the power required for the abdominal crushing clamp, and especially for that introduced by Mr. Ernest Miles, it occurred to me that the use of an eccentrically pivoted disc might prove convenient. The illustration explains the arrangement used. The handles of the forceps have slots cut in the terminal portion for the attachment of the pressure device. Across one of these a strong pin passes; the other slot is open, but to the outer side of the handle at this point friction rollers are attached, one pair at each side. The pressure device consists of a flat bar, slotted near one end to receive the pin in the forceps handle, while at the other end it carries the pivot of the eccentrically mounted disc, which is itself slotted to receive the bar and is provided with a handle for the application of power. In use the forceps are applied in the usual way, and after compression by the hand the slotted end of the flat bar



is fixed on to the pin in the forceps handle and the eccentric disc pushed on to the friction rollers with the handle of the disc pointing away from the blades of the forceps (position of minimum pressure) where it automatically fixes itself. Full compression is then obtained by forcing the lever forwards—i.e., toward the blades of the forceps.

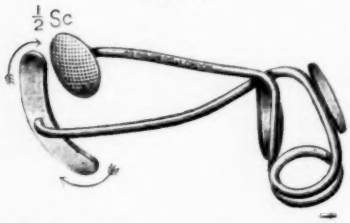
The instrument has been made according to my suggestions by Messrs. Allen and Hanburys, Ltd.

LAURENCE C. PANTING, M.D. Oxf., F.R.C.S. Eng.

(1) A TONSIL COMPRESSOR; (2) A SEPTUM NEEDLE.

THE *tonsil compressor* (Fig. 1) is a light clamp constructed on the principle of the cross-action spring. It is self-retaining, and no ratchet is required. The instrument is intended for use *during* the operation of tonsillectomy, and not for the arrest of severe hæmorrhage after operation. It is not cumbered with any clip for the attachment of a swab. After removal of a tonsil a small swab is placed in the tonsillar fossa by means of a long dissection forceps, and the clamp then applied above this. As the proximal part is at right angles, approximately, to the "business end," the clamp can be left *in situ* while the second tonsil is removed, and does not interfere in any way with the use of the guillotine or dissection instruments. The second fossa can then be compressed by another clamp, and adenoids removed without any interference and in a field free from bleeding.

FIG. 1.



A Septum Needle.—The use of a hollow needle for intranasal suture, most frequently employed at the end of submucous resection of the septum, is by far the easiest method in the limited space available; and, owing to difficulty in finding a suitable hollow needle for the purpose, I have devised the needle here illustrated (Fig 2). The proximal end is smoothly funnel-shaped, and the distal end is bevelled towards the inside of the curve; the length and depth of the curve have been adopted after repeated trials to find the most suitable. While retaining a certain degree of

FIG. 2.

"spring," the needle is firmly mounted in a short handle. The calibre is such as to admit horsehair, No. 000 catgut, or ophthalmic silkworm-gut. In use, the needle is threaded up to the point, and, after the needle has been passed through the edges to be sutured, the suture is pushed on until it can be grasped by a forceps; the needle is then withdrawn, and the suture is left in place ready for tying. Not only can the edges of the incision be readily sutured in this way, but small tears in the septal flaps, even far back in the nose, can be repaired, the knot being slipped back by holding one end of the suture in a Tilley's forceps.

Both instruments are made in stainless steel by Messrs. Down Bros., St. Thomas's-street, S.E. 1.

H. ROSS SOUPER, M.D. Aberd.

Reports and Analytical Records.

FRIEDRICHSHALL NATURAL MINERAL WATER.

PROPRIETORS: C. OPPEL AND CO., FRIEDRICHSHALL, SAXE-MEININGEN, GERMANY.

AGENTS FOR GREAT BRITAIN AND IRELAND: INGRAM AND ROYLE, LTD., 45, BELVEDERE-ROAD, LONDON, S.E.1.

THIS well-known water can be used as an ordinary aperient, for congestion and fatty degeneration of various organs, as a preventive against uric acid, gravel and stone in the bladder, and in the treatment of gout. The water is bright in appearance, odourless, and has a pronounced bitter saline flavour. When analysed the following results were obtained:—

	Parts per 100,000.		Parts per 100,000.
Total solids after ignition ..	2700	Iron (Fe_2O_3) } Alumina (Al_2O_3) }	8·0
Sodium (Na) ..	572·6	Chlorine (Cl) ..	958·5
Magnesium (Mg)	251·8	Sulphates (SO_4)	920·0
Calcium (Ca) ..	16·0		2730·9
Silica (SiO_3) ..	4·0		

Specific gravity—1023·0

It is customary in setting out the analysis of a water to show the acids and bases combined as salts so as to indicate the manner in which they exist in solution. Among other possible combinations this water may have the following composition:—

	Parts per 100,000.		Parts per 100,000.
Soldium chloride ..	1023	Oxides of iron and alumina	8
Sodium sulphate ..	523	Calcium carbonate ..	23
Magnesium chloride	436	Calcium chloride ..	20
Magnesium sulphate	708		2745
Silica	4		

The water was free from organic impurities.

VICTORIA HOSPITAL FOR SICK CHILDREN.—Mrs. Alexander Campbell has opened an artificial light department at this hospital in Tite-street, Chelsea. The cases suffering from tuberculous glands are doing well, and Dr. Murray Levick stated that the results obtained justified the conclusion that children living in their own homes and attending the hospital for a prolonged course of treatment three times a week progressed as well as those who were sent to Alpine institutions.

THE LANCET.

LONDON: SATURDAY, APRIL 30, 1927.

DISTRIBUTION OF GOITRE IN ENGLAND AND WALES.

IN countries which enforce military conscription the geographical distribution of goitre can be deduced from the physical condition of recruits, but in England no reliable statistics were available until the recent report of school medical officers throughout the country on the incidence of goitre among school-children during the year 1924–25. The investigation was made at the request of the Board of Education, and was not limited to an enumeration of the children who showed enlargement of the thyroid. Much collateral research was undertaken, and this made it clear once again that simple goitre is the outward and visible sign of a general physiological imbalance. Dr. KENNETH FRASER, assistant medical officer of health for Cumberland, regards goitre as a danger-signal indicating a grave departure from the normal working of the body as a whole. This departure is often associated with disease, and Dr. E. H. MILLIGAN, of Glossop, points out that in goitrous children there is an increased incidence of ear, nose, and throat affections, and also of rheumatism; Dr. DUNSTAN BREWER, of Swindon, finds that myopia is twice as common in them as in normal children, whilst other observers, as is well known, attribute a variety of maladies to thyroid inefficiency. Were simple goitre due solely to iodine deficiency these far-reaching metabolic changes would be harder to explain than if, as Lieut.-Colonel R. MCCARRISON'S latest experimental work seems to suggest (see p. 916), goitre is associated with an ill-regulated diet short of certain accessory factors.

Quite apart from concurrent abnormal conditions of the body which may be related to goitre, it is by no means clear what association there is between toxic and exophthalmic goitres and those of the simple type. With a view to eliciting some relationship Dr. J. M. H. CAMPBELL recently made a detailed study [1] of the school medical officers' reports in order to compare the distribution of simple goitre with the distribution of deaths from exophthalmic goitre as ascertainable from the reports of the Registrar-General. An initial difficulty was to find a definition of goitre comprehensive enough to make the results of the medical inspectors comparable. For this purpose they were divided—though the classification is admittedly imperfect—into those in whom the thyroid was so much enlarged that the increase in the size of the neck was noticed on casual inspection (without measurement or palpation), and those in whom it was not thus enlarged. Previous investigations had shown that the incidence of goitre in school-children is greatest at the leaving age, and in his review Dr. CAMPBELL therefore included only children between 13 and 14 years of age. He found that individual variations in the reports were very great, and neighbouring towns or areas where the conditions were similar showed such differences that he decided to rearrange them. Small areas were combined in larger ones, and Dr. CAMPBELL believes that certain general conclusions can be drawn from the results. The figures for county areas were regarded as being most likely to give the geographical information required, and were therefore considered in detail.

The conclusions drawn from the analysis are that goitre is twice as common in the country as in towns, that it is more than twice as common in the west of England as in the east, and that it is nearly three times as common in girls as in boys. Roughly speaking, the incidence-rates for towns, although generally lower, confirm the results for the country areas. The urban rates are more variable, as Dr. CAMPBELL says, "possibly because the greater uniformity of a town water-supply may minimise or exaggerate the effect of the average water-supply of the villages and smaller towns of the area." The percentage incidence for London, although not given, is stated to be very low, whilst those for Manchester (9·7), Bristol (7), and Birmingham (6·3) are high. Three maps are given showing: (1) the incidence of goitre in school-children in the counties; (2) its incidence in 17 large areas (rural and urban figures); and (3) the death-rate from exophthalmic goitre in the same 17 areas. Comparison of the two last shows a general resemblance between the incidence of goitre and the mortality from exophthalmic goitre; in order to obtain a more objective measurement of the correlation Dr. CAMPBELL gives a scatter diagram which, although showing no very close agreement, indicates that simple and exophthalmic goitre tend to increase together. The remaining conclusions reached are that goitre is relatively common in the south-west of England (in which Wiltshire and Hampshire should probably be included), in Hereford and most of Wales, in much of Lancashire, Cheshire, Derby, and Nottingham, and in a Midland area comprising Oxford and perhaps Buckingham and Northampton. Goitre is least common in Glamorgan and Monmouth, Essex, Hertford, and Middlesex, and an eastern area running north from Hertford and Essex up to and including Lincolnshire. There is no evidence that proximity to the sea coast is a factor of predominant importance. Most of the districts where the incidence is specially low and many where it is specially high are on the sea-coast. In England, as in most other countries where the incidence of goitre is known, hills seem to play a much more important part than the sea. The apparent correlation between the incidence of simple and exophthalmic goitre is of great interest, though, as Dr. CAMPBELL points out, it has to be remembered that a proportion of the deaths registered as due to exophthalmic goitre may in fact be due to hyperthyroidism associated with an adenomatous gland.

[1] Journal of Hygiene, March, 1927.

THE MORTALITY FROM INTESTINAL OBSTRUCTION.

INQUIRY into the results of the treatment of acute intestinal obstruction has revealed the fact that the mortality of this serious disease has scarcely fallen with the great advances in general abdominal surgery during recent years. Certainly, as in every other surgical emergency, the patient's prospect improves in proportion as he comes in good time into the surgeon's hands, but the toxæmia which is the primary cause of the high mortality-rate develops early and renders futile the most skilful operative technique. Early operation under favourable circumstances has not sufficed to bring the mortality down much below 20 per cent., while over a large

series of cases it may approach 50 per cent. That it should remain almost stationary at this level points to some defect in our knowledge of the pathology of the condition. An attempt to clarify the problem was made by Mr. B. W. WILLIAMS in a recent Hunterian lecture which is printed in our present issue. Mr. WILLIAMS points out how the aspect of a patient suffering from acute intestinal obstruction or the ileus of advanced peritonitis resembles very much that of an individual the victim of gas-gangrene. The character of the pulse, the cyanosis, the slight icterus, and mental reaction are very similar. Indeed, in severe cases of acute septic appendicitis anti-gas-gangrene serum has actually been administered with some apparent success by certain French observers. Mr. WILLIAMS set out with the hypothesis that in ileus the toxæmia and death which occur in spite of mechanical relief were due to poisoning by *B. welchii*. He found that this organism, which is an almost constant but not flourishing denizen of the alimentary canal, proliferates abundantly in the obstructed bowel. It does not normally grow well in the stomach and large intestine because it is very sensitive to the presence of acid. It can flourish in the small intestine, whose contents are alkaline and free from oxygen, but does not get much chance of doing so unless stagnation occurs. Favourable conditions, however, prevail in mechanical and paralytic ileus. It is not only present in large numbers in the contents of the intestine in such cases, but was found in the vomit of a very large proportion of patients. Experiments were also performed which seemed to show the presence of the toxin of *B. welchii* in the fæcal contents above an obstruction. It is easy to see how absorption by the damaged mucosa could lead to the very grave general condition associated with the later stages of intestinal obstruction or peritonitis, and if, as it seems, the toxin directly paralyses the smooth muscle of the bowel wall, the body would be unable to rid itself of the source of the toxæmia, even though the mechanical block were removed. The natural development of these researches was the administration of an antiserum to a series of actual cases of septic appendicitis and intestinal obstruction. This clinical test was carried out and appears to have justified the hopes raised by a consideration of the results of the previous researches. In a series of 214 cases of obstruction, due to many different causes, the mortality-rate was 24·8 per cent.; in a series of similar cases, differing only in the fact that antitoxin was given, the mortality-rate was only 9·3 per cent. Mr. WILLIAMS suggests that there may be a further saving of life from prophylactic injection prior to operation, for sudden collapse is not uncommon after the most successful operative relief, due, he suggests, to the sudden flooding of the circulation with a lethal dose of toxin as a result of the relief of strangulation. Control of the toxæmia by a lavish use of hypertonic saline intravenously was suggested a year or two ago to the Western Surgical Association, U.S.A., by Dr. T. G. ORR, who also brought experimental evidence in support of his thesis. Others have reported favourable clinical results, most recently Dr. E. P. COLEMAN, of Canton, Ill., who has reduced his operative mortality thereby from 50 to 11 per cent. A quart of 3 per cent. saline is given before and as much, or more, following the operation, with the result of enabling the toxic patient to live until he has recovered from the effect of the surgical intervention. These are distinct contributions to our knowledge of very fatal diseases and place within our grasp new weapons against them.

THE FOLLICULAR HORMONE.

DOUBLE oöphorectomy abolishes the cyclic changes which normally take place in the female genital tract, and it has been concluded that the ovarian influence thus removed is hormonic in nature. That this is so is suggested by the experiments of E. KNAUER (1900), who showed that the cyclic changes continue if the ovaries, instead of being destroyed, are merely transplanted to another site in the body. Until recently, however, there has been doubt as to which part of the ovaries supplies the hormone. Of the various methods employed to localise this function the most direct is the injection of ovarian extracts into test animals, but lack of a satisfactory test for their action made the results inconclusive until, in 1917, C. R. STOCKARD and G. N. PAPANICOLAU [1] demonstrated a method of following œstral changes in the guinea-pig by the microscopical examination of vaginal smears. It was found that there is, during the cycle, a definite succession of cell types in the vaginal lumen, each type being correlated with a certain phase of œstrus; the identification of these types furnishes reliable data for determining what is happening in the internal genital organs. With this accurate method of testing, E. ALLEN and E. A. DOISY were able to deal conclusively with the œstrus-producing hormone of the ovary. They published in 1923 a preliminary report on the results of injecting fresh follicular extracts into rats and mice, and in 1924 a full report [2] of experiments showing that the injection of liquor folliculi into spayed rats and mice induces typical œstral changes, comparable in degree to full œstral development of the genital organs of normal animals. They concluded that these injections were a complete substitute for the ovarian hormone—at least in the absence of pregnancy—for they produced in the genital tract the accelerated growth, hyperæmia, and secretion characteristic of the period of œstrus, the changes being as great as those attained in the normal animal under ovarian influences.

These observations indicated that the principal ovarian hormone is formed in the follicle, and in the last few years series of experiments have been made which have increased our knowledge further. In 1926 E. ALLEN and J. P. PRATT published [3] the results of injecting follicular extracts into monkeys and human beings, whose ovaries had previously been removed. Growth of the uterus was again found to follow injection and, in women in whom an artificial menopause had been induced, this uterine growth was accompanied by subjective sensations similar to those previously experienced at times of menstruation, though there was no bleeding approximating to that of normal menstruation. Injection was also tried in cases of primary amenorrhœa—that is to say, in girls who had reached the age of 20 without having menstruated. Menstruation did not follow this treatment, but again there was an increase in growth in the uterus, though without recognisable subjective symptoms. Better results were obtained in girls with irregular and scanty menstruation, an increase being noticed in the amount and regularity of the flow. Similar observations have recently been made by L. BROUHA and H. SIMONNET [4] in Paris.

The œstrus-producing hormone can be found not only in the follicle but also in placental extracts, and the term "folliculin" should, perhaps, be abandoned in favour of "œstrin," as is suggested by A. S.

[1] Amer. Jour. Anat., 1917, xxii., 225–285.
[2] Ibid., 1924, xxxiv., 133.
[3] Jour. of Amer. Med. Assoc., 1926, lxxxvi., 1964.
[4] Presse Médicale, 1926, cili., 1619.

PARKES and C. W. BELLERBY. These English observers have studied the problem from a rather different aspect.[5] They point out that as œstrus does not occur in either pregnancy or lactation, it is probable that an œstrus-inhibiting mechanism is set up by the persistent corpus luteum which is formed during these periods—a theory which has been put forward by L. LOEB. The exact nature of the mechanism is not clear, but PARKES and BELLERBY have shown that injection of œstrin during the early stages of pregnancy overrides the œstrus-inhibiting principle and causes the rapid reappearance of œstrus and the termination of the pregnancy. The same result is obtained in the later stages of pregnancy and during lactation, but the dosage required is greater in each case. They remark that these results may have a possible application to medicine and animal breeding. In cows the undue persistence of corpora lutea is responsible for a type of sterility which is now cured in many cases by squeezing out the corpora lutea per rectum. It is possible, they think, that the injection of œstrin would override this inhibitor action of the persistent corpus luteum, and as a result lead indirectly to ovulation and to the restoration of fertility. It is suggested, also, that in the human subject a type of amenorrhœa occurs which is due to the failure of the corpus luteum to retrogress and which is analogous to prolonged pseudo-pregnancy. In such cases it would seem that the overriding of the corpus luteum by injections of œstrin might lead to the reappearance of the menstrual cycle. In any case it is obvious from the facts which have been discussed that the appearance of an active follicular extract has a considerable application in clinical medicine, and a new field of research has been opened up to those who are interested in these problems.

THE TREATMENT OF RABIES IN CALCUTTA.

THE second annual report[6] of the Pasteur Institute in Calcutta deals with the year 1925, when 5585 patients attended the dispensary, of whom three-quarters went through a course of antirabic treatment. None of the 247 Europeans or Anglo-Indians who underwent treatment died of hydrophobia, although 33 of the 3921 Indians succumbed. It is, however, made clear in the report that conditions were very much more favourable in the one case than in the other. Half the Europeans were no more than licked by the rabid animal, only 17 per cent. of them had deep bites, none was bitten by a jackal, and 82 per cent. presented themselves at the institute for treatment within a week of contact with the rabid dog. On the other hand, in 98·8 per cent. of the Indians the skin was broken, 46 per cent. were bitten deeply, in 33 per cent. the bite was of a jackal, and more than one-third did not reach the institute until a week or longer had elapsed after contact. Sixteen of them developed hydrophobia either during the course of treatment or within 15 days of its completion, and these can hardly be considered to be failures of treatment; but the remaining 17, which developed symptoms later than this, are set down as actual failures of treatment. The number of cases advised is many times greater than in any of the Pasteur Institutes situated in the hills and shows the real service which has been done to the city by its foundation. The work has been carried on under great difficulties in a single room of the School of Tropical Medicine, the whole staff working at high pressure throughout the year, including Sundays and holidays.

[5] Jour. Phys., 1926, lxii., 145 and 301.
[6] Bengal Secretariat Book Depôt. 1926. 1s. 6d.

Annotations.

"Ne quid nimis."

A MODERN TROOPSHIP.

ABOUT a week ago the transport *Neuralia* sailed from Southampton with troops for China, and a representative of THE LANCET was given permission to go over her during embarkation. It is difficult to know what a trooper will be like during a passage until one has sailed on her, but it was evident that the standard of comfort in such vessels has risen considerably of late years. During the war *Neuralia* was a hospital ship, being first fitted out at Alexandria by the Red Cross; now she has been trooping for three years and has all the fittings that are required and a staff that knows its business. A transport nowadays is not filled to the brim as in former times. The men have more space, consequently the messes are less crowded, and in *Neuralia* this means that there are no messes amidships, where the accommodation corresponds to the inside rooms of hotels, or the inside cabins on mail steamers. This is a great advantage. The hammock plan, too, has been carefully rearranged to ensure that the men's mouths are more than 4 feet from one another so as to minimise the spread of infection by droplets in sneezing or coughing. By way of additional ventilation this ship has some air-blowers about her decks; flat electric fans are fitted in considerable number on the troop decks, and there is one in each cabin. Though these fans do not bring in fresh air they circulate what there is and utilise the whole of its drying power to the increased comfort of the inhabitants. As the R.A.M.C. officer in medical charge on a transport is now in charge of the crew and their living arrangements, our representative was allowed to see the accommodation provided for the lascars and this, after the excellent troop decks, he found disappointing. "No doubt," he says, "the men berthed here had each the 72 cubic feet the Board of Trade requires they shall have, and probably they had all the light the Board of Trade thinks sufficient, yet, compared with those others, the lascars' crew spaces can only be thought dark and crowded, though much trouble was clearly taken to keep them clean."

Drinking water taps are on all troop decks and the water is sterilised when necessary. The washing arrangements for the troops are very complete; there are tip-up wash-basins with a supply of cold water, and under each basin is a small trough for washing clothes. Over the impervious floor of the ablution room are the douches which will be found so useful in the tropics. Large canvas baths are also carried in which, when they are rigged up on deck, a man can swim a few strokes. There is a dispensary for the troops aft, and a small hospital, while on the detached poop is an isolation hospital of three beds with a cabin for an orderly; here, too, is a steam disinfector. It is expected that a quarter of the men will every night be either on duty or sleeping on deck, but actually it is probable that about half of them will sleep on deck once the ship passes Port Said, for it is hot now in the Red Sea. The messing scheme promises well. For breakfast the men get tea, porridge, and a second course of kipper, fresh fish, or sausage; for dinner they have roast, boiled, or stewed fresh beef or mutton, potatoes, and a vegetable—green for some days after leaving port, and dried thereafter. Tea is the same as breakfast but without porridge, and in the hot weather corned beef (cooled in the refrigerator) will be an acceptable substitute for sausages. For supper there is cocoa and ship's biscuit. Every man may have, on payment, a pint of beer with his dinner, and there is a canteen. At dinner-time every day the orderly officer produces his mess board and adjusts complaints, if there are any.

The men embarking, our representative states, seemed a more even and, perhaps, a sturdier lot than

before the war. There was no confusion, and what used to be called "language" was not heard, which may have been due to the greater space provided per man. At any rate it is clear that the recent improvements in the transport of troops by sea have justified themselves in the lessening of illness; whereas in 1913 there were 631 admissions for illness per 1000 men carried by sea and 1·08 deaths, in 1925 there were but 184 admissions and no deaths at all. Thus the R.A.M.C. makes progress in its admirable work for the prevention of disease in the Army at sea no less than in the Army ashore.

B.C.G. VACCINE.

A YEAR ago we reviewed [1] at considerable length the collected reports, extending over a period of years, of Prof. A. Calmette [2] and his collaborators on the use of the prophylactic antituberculosis vaccine B.C.G. This vaccine is prepared from a bovine strain of tubercle bacillus which, at the outset of the immunisation tests, had already been subcultured for a period of 13 years on a medium of glycerinated ox-bile until its virulence had become markedly attenuated and it could be inoculated in the living state without producing harmful effects. The vaccine has been administered to laboratory animals and to calves—orally, intravenously, and subcutaneously—and for the past three years has been given by mouth to new-born children in the first fortnight of life. It will be remembered also that a series of experiments on the higher apes in a tropical island was undertaken with encouraging results, and gained considerable prominence in the lay press. The earlier reports seem conclusively to have demonstrated the fact that the vaccine is harmless, even when given to new-born infants. The next point to be established by Prof. Calmette was the value of the vaccine as a prophylactic agent. This is obviously a more difficult matter requiring much time and patience in waiting for results and collecting records. Prof. Calmette has now brought together a number of these records [3] in what is for practical purposes a monograph of the subject up to the end of 1926. By this date the number of children vaccinated is known to have reached 21,200. Presumably these figures include those given in the previous monograph a year ago. No complete analysis of the whole of these figures has yet been attempted, but several reports of special groups are now given. The first of these is by Mr. Moine, statistician to the Comité National de Défense contre la Tuberculose, and is concerned only with infants which have been in contact with a tuberculous person or have been living in a tuberculous environment. The total number thus investigated is 982. From this figure 13 are deducted because it was found necessary to remove them from their tuberculous environment. Of the remaining 969, 882 are reported upon one to two years after vaccination; they show seven deaths from tuberculosis and 72 from other diseases, whilst 87 reported upon more than two years after vaccination show no deaths from tuberculosis. It is concluded, therefore, that the mortality from tuberculosis amongst these vaccinated cases in the second year of life is approximately 0·8 per 100 living, and from all causes 8·9 per 100. The mortality in the same age-group amongst children born of tuberculous parents or living in a tuberculous environment is placed by Prof. Calmette from available records in various European countries at 26 per 100 living. By way of comparison statistics recorded by Dr. Ott, of the Hygiene Department of the Seine-Inférieure, and by Dr. Morlot, of the Dispensaire Brouardel of Havre, are given. These and other reports from Belgium, Rumania, Greece, Algiers, and Indo-China confirm, in the main, the statistics of the Comité National. The monograph also contains reports of an experiment in prophylactic vaccination of calves on an infected farm, some experiments upon laboratory animals, and a long report of a Ukraine Commission on the subject by Prof. S. Zlatogoroff. The work on the infected farm of Gruville shows that at the commencement of the experiment in 1921 41·7 per cent. of the cattle were reactors to tuberculin whilst there had been unmistakable post-mortem evidence of tuberculous infection. From 1921 to 1926 B.C.G. vaccine was administered to the calves born each year. At the end of 1926 the position was that 11 animals of the original infected stock still remained, 58 born since the experiment and vaccinated shortly after birth had been added to the herd, 30 had been slaughtered for commercial purposes without evidence of tuberculosis being found, whilst 22 had died of diseases which were found to be non-tuberculous. No precautions against tuberculosis other than B.C.G. vaccination had been adopted on the farm during the experiments. Prof. Calmette sums up this work in his own inimitable way—"simplicité, innocuité, efficacité." We have already indicated in the previous review our opinion that much painstaking research is still required before a final conclusion can be drawn. The need is not so much for piling up large numbers of statistics as for intensive research on those patients and animals already vaccinated. In the case of the infants a systematic scheme of after-care with periodic re-examinations is obviously required. So far the post-mortem evidence on the cases (children and animals) which have died appears to be weak as regards inclusion in the non-tuberculous group.

[1] THE LANCET, 1926, i., 1046.
[2] Annales de l'Institut Pasteur, 1926, xl., 89.
[3] Ibid., March, 1927, xli. 201.

VITAMIN D IN WINTER MILK.

INTERESTING attempts are being made to improve the value of winter milk in vitamin D. It is an unfortunate dispensation of Nature that just at the winter season, when the human being is deprived of ultra-violet light, many of his chief articles of food also decline in their content of vitamin D from the same cause. The animals and plants growing in these islands are also deprived of ultra-violet light in the winter and their value as food accordingly diminishes. The diminution is most marked in the case of cow's milk and its derivatives and constitutes a serious problem in the feeding of infants and young children, particularly in the north, where winter conditions of life, both for children and cows, last so much longer than in the south. The prophylaxis of rickets in such young children might be secured by the universal administration of cod-liver oil, but though it is found possible to secure a very wide use of it, such a *universal* consumption seems unattainable. Nor can ultra-violet light be distributed generally, and in any case universal prophylaxis for the winter would be more naturally accomplished by dietetic means. A distinct step towards that most desirable goal has been made in the work of Dr. J. Golding, of the National Institute for Research in Dairying, in coöperation with Miss K. M. Soames and Dr. S. S. Zilva [1] of the Lister Institute. These workers have been successful in raising the vitamin D value of cow's milk by feeding the cows with cod-liver oil. Such a means of improving the vitamin D content of milk should add little to the price of the milk and compare favourably, as regards the cost of production, with direct irradiation of the cow. The latter method is being practised by Prof. C. Pirquet [2] in Vienna, where the problem is an even more serious one, since the cows which provide the milk for the city are kept in stall all the year round, and the milk given is consequently always a winter milk in its content of vitamin D. Prof. Pirquet has had some very promising results, both with animals and children, when using this milk, and though the method is at present experimental—it has only been applied to two cows—it would be easy to apply it to all the cows, some 20, in his model stall. The

[1] Biochem. Journal, 1926, xx., 1306.
[2] V. Bruck, C. Pirquet, and R. Wagner: Appearing shortly in he Klinische Wochenschrift.

mercury-vapour quartz lamp is movably suspended from the roof and at present only travels as far as the second cow, but it could easily be made to travel the whole length of the stall. With Viennese conditions and prices this method has not been found too expensive. Attempts such as these are encouraging and point, we hope, to a time when it shall be compulsory for nursery milk, if not for all milk, to be produced in such a way that its vitamin D content can be guaranteed to reach a definite standard. At the same time it is essential that the cost of the milk should not be materially increased.

THE TEACHING OF BACTERIOLOGY IN LONDON.

THE supply of young and well-trained bacteriologists is unequal to the demand for them both in this country and abroad, and this deficiency must be regarded as partly due to a lack of facilities for the training of suitable students. These facilities may be provided either before or after graduation. Bacteriology may be recognised as a subject for a science degree—as is now done at several of the universities—and thus form an important part of the undergraduate's training; at Cambridge a course of bacteriology can be taken, with pathological work, by those who go on to the second part of the Natural Science Tripos. Alternatively, the instruction may be given after medical qualification, and for this purpose it is convenient to provide a whole-time course leading, perhaps, to a university diploma. In London, especially, it is desirable that such courses should be made available, if only as part of the scheme for making London the main centre of post-graduate education within the Empire. It is satisfactory, therefore, to learn of the opening in October next of the Division of Bacteriology and Immunology of the new London School of Hygiene and Tropical Medicine. The board of management has decided to start the work of this division in temporary premises in Gordon-square, pending the completion of the school buildings, and during this interim period a whole-time post-graduate course in bacteriology will be given under the immediate direction of Prof. W. W. C. Topley, who is to occupy the university chair of bacteriology and immunology in the School. It will not be possible to arrange instruction for candidates for the Diploma in Public Health until the accommodation to be provided in the main building becomes available. In the meantime inquiries about the bacteriological course should be addressed to the Director of the London School of Hygiene and Tropical Medicine, at 37, Torrington-square, W.C.1.

THE HAIRMYRES TUBERCULOSIS COLONY.

THIS institution chiefly serves the middle ward of Lanarkshire, though patients are admitted from other parts of the county and from outside. The report of the physician-superintendent, Dr. James Johnstone, shows that 306 patients were discharged during 1926. Of these 149 were pulmonary and 133 non-pulmonary tuberculosis, and the remaining 24 included three cases of syphilis, two of bronchitis, one each of bronchiectasis and gastritis, and 17 in whom no tuberculous lesion could be detected. Miners exceeded other occupations among the patients, mining being the chief industry of the area. Of the 149 pulmonary cases, 51 belonged to the early maturity age-group (between 25 and 45 years), 59 per cent. had been ill for over four years, and 75 were in the Turban-Gerhardt stage I. Of the 75 stage I. patients 24 showed arrest of the disease, of the 47 stage II. 6, and of the 27 stage III. none. The average duration of stay was 306 days for stage I., 330 for stage II., and 247 for stage III., and 21 per cent. had a positive family history. The 133 non-pulmonary cases included 78 of cervical glands and 20 abdominal cases, and the average stay for children was from seven to eight months, one year being the duration aimed at. About 30 per cent. gave a positive family history. The discharges included 52 ex-Service men and 102 of the 125 adult males discharged were registered for training. Thirteen per cent. of the adults admitted gave a positive Wassermann reaction as compared with 5 per cent. in the previous year.

It was a good summer for heliotherapy and satisfactory results were obtained among the children. Some 33 patients had artificial light treatment, the cases which did best being lupus, glands with discharging sinuses, and tuberculous abscesses of the soft tissues (scrofuloderma). Dr. Johnstone comments on the fact that the more advanced broken-down glands did better than the enlarged glands which had not broken down. For 29 the carbon arc was used, for three the mercury vapour, and for one both. Dr. Johnstone prefers the polar white flame positive carbon with the solid ordinary negative carbon, when used in the open carbon arc lamp. He is inclined to recommend the installation of both types of lamp for clinics, the carbon arc for general and the mercury vapour for local treatment. The average number of scholars in the open-air school was 93. In the colony departments, the working hours varied from two to six per day; the number of patients enrolled for training was for gardening 46, for the forest nursery 65, for the poultry farm 63, for the piggery 24, and for the institution workshop 11. The guinea-pig department had a heavy mortality among the young stock from an obscure disease with diarrhœa as the chief symptom.

The industrial workshops had 24 trainers in the motor-repairing department, 19 in cabinet making, 11 in boot repairing, and 9 in basket making. As regards the first, the two motor lorries of the colony are kept in order, while the Ford Motor Company kindly lends the latest type of chassis for the training; and the three trainees who entered for the certificate of the Scotch Automobile Club were successful. As regards the last, it is noted that there is a dearth of good basket makers in Scotland and that pigeon baskets, for example, can only be procured in England. Approximate figures are given of after-results of training. Thus, of ten men trained in cabinet making, four are working at the trade, while two out of four, five out of ten, and 16 out of 20 are now working at the basket making, boot repairing, and motor repairing respectively for which they were trained.

SARCOMA OF THE RECTUM.

ACCORDING to Dr. J. H. Weeks, of the Lankenau Hospital, Philadelphia, who records an illustrative case,[1] sarcoma of the rectum is an exceedingly rare condition. Among 100 malignant rectal tumours Hartmann and Quenu did not find one sarcoma; inquiries at 150 of the principal hospitals and museums of Great Britain and Ireland produced only two cases, whilst among 500 patients operated on by D'Hochenegg from 1900 to 1907 for malignant growth of the rectum only four had sarcoma, the growth being of the melanotic type in two of these. Although approximately 100 cases of sarcoma of the rectum have been recorded, the number would, in Dr. Weeks's opinion, be reduced by over a half if the questionable cases were excluded. The growth usually begins in the submucous coat as a small, nodular mass, movable on the muscular coat and absolutely independent of the mucosa which is usually intact. As it progresses it tends to invade the mucosa, when ulceration frequently occurs. Sarcoma is, as a rule, hard in consistence until ulceration takes place when it becomes soft and spongy. Rectal sarcoma is much commoner in men than in women in the ratio of about 5 to 1; the ages recorded range between 35 and 81 years. The symptoms differ only slightly from those of carcinoma, but the latter ulcerates more quickly, gives rise to cachexia sooner, involves the lymphatics, and is practically never pigmented. Sarcoma generally causes less pain than carcinoma, and the spread is by the blood

[1] Surgery, Gynecology, and Obstetrics, March, 1927.

stream rather than by lymphatics. X rays and radium, Dr. Weeks considers, are valueless in the treatment; owing to the rapid and fatal metastases which may take place, an early and very radical operation is indicated. His own case was that of a man, aged 40, who in spite of repeated operations and X ray treatment died of general sarcomatosis seven months after appearance of the first symptom.

WANTED, A SCIENTIST.

AN advertisement in THE LANCET this week states that, certain preliminary work with children of 4–7 years of age having been done successfully at the Malting House School, Cambridge, the directors of the school propose to make a full-time and long-term appointment of a suitable man to introduce young children to science and scientific method. The directors are prepared to pay a salary that will enable a successful candidate to leave his present occupation whatever that may be, an openhanded policy that indicates awareness that the search for the man may be a difficult one. The advertisement sets out the nature of the problems which he will have to tackle, from which it appears that the pedagogue—using the word in its exact sense—will need to understand the urges of the childish mind, that he may discover how these can be best converted into a controllable instrument of organised thought. The use of apparatus specially designed for children is considered a necessity, and this must be of a sort that lends itself to any modification that is required by the growing intelligence of the child; the methods of instruction are to be developed alongside of the developing child, his immature mental processes being studied, and the demands of reality being graded to his capacity. The directors of the Maltig House School state that while they are willing to consider applications for the post from the teaching profession, they look rather to a man who has already engaged in some sort of scientific work and whose reactions to children have not been influenced by the necessity of teaching them. Sir Ernest Rutherford, P.R.S., Prof. Percy Nunn, and Mr. J. B. S. Haldane will assist in the final selection of a candidate for a highly original appointment.

ARSENICAL CONTAMINATION OF FOOD.

SINCE the great "arsenic in beer" scare of thirty years ago various sources of arsenical contamination of food have from time to time come to light. A not very obvious source of this unpleasant element was pointed out in 1924 by G. D. Elsdon, who examined 51 wrappers of proprietary breads and found arsenic in nine of them. No enterprising daily journal has taken up this matter under the attractive headline of "Death in Wrapped Bread," but the question of arsenic in wrappings has been further investigated by Mr. T. Hedley Barry, who has published a paper in the current number of the *Analyst* on Arsenic in Printing Ink. He points out that the source of arsenic in the wrapping papers was probably the printing ink of the labels, which were blue, purple, and green, and as more brilliant colours are used in the wrapping of confectionery he has investigated some of the papers used. As confectionery is frequently of a moist and sticky character and is largely consumed by children who are as frequently of a similar character he wisely suggests that the limit of arsenic should be almost as stringent for the wrapper as for the wrapped. The practice of manufacturing confectioners is usually to stipulate from the printer that arsenic-free colours shall be used, and he in turn passes on this requirement to the ink-maker. But arsenic may be present in the paper itself, and this may be a much more important matter when the amount of printing is small. The limit of arsenic proposed for beer—namely, 1 in 700,000 or 1/10 gr. per gallon—would be impractically rigid for printing materials; zinc oxide, for instance, of B.P. quality, with its limit of 1 in 100,000, would not pass this test. It appears that the wrapper seldom weighs more than 5 per cent. of the total weight and that about 0·5 g. per square metre is about the limit of ink on paper. Mr. Barry considers, having regard to these facts, that ink containing less than 1 part of arsenic in 50,000 of pigment may be used unconditionally, that those containing between this limit and 1 in 20,000 may be used with the less arsenical ones, and that none exceeding this limit should be used at all. A variety of colours examined fell mostly in the first class. Arsenic has been found, as is well known, in imported American apples. Lendrich and Mayer (2 Unters. Leitungsm., 1926, lii., 441–457) have found arsenic in dried pears (unpeeled) and even in partly peeled apple-rings. It is possible to be too exacting in requirements as to the quality of food, but these various sources of arsenic, like those of boric acid and similar preservatives in foods, need careful watching. It may be that the day is far distant when the poisoner will kill his victim by means of a carefully chosen diet no one article of which comes within the scope of the Poisons Acts, but the detection of arsenic in food products and their adjuncts does point to the possibility of injury to health of a kind to baffle the physician as to its origin and nature and to complicate the action of the drugs he may see fit to administer. So far as can be seen, it is likely as new methods of treating, packing, and distributing food products are adopted new sources not only of arsenic but of other poisonous substances will need to be guarded against. This is a matter on which the Ministry of Health and the medical profession should keep watch.

THE ENGLISH PUBLIC-HOUSE.

THE amenities offered by the public-house have been made the subject of constant strictures in the press, and not long ago in these columns the suggestion was made by a writer that it was to the interests of the extreme temperance cause to see that no improvements took place, because with the betterment of the public-house there would disappear one of the most obvious arguments against the use of alcohol. In Carlisle there will shortly be opened a model place of refreshment in the heart of the town, replacing an old public-house, and it seems that the new establishment may serve as an example of what can be done to render the public-house a place of pleasant resort and a useful centre for the promotion of social activities. The premises are thoroughly well equipped and arranged in such a way that both sexes can use them either in common or reserved rooms, but the character of the public-house will be preserved—that is to say, that, while such adjuncts to drink as bread-and-cheese, sandwiches, and cake will be provided, there will be no restaurant. The house will, in short, be one "licensed for the sale and consumption on the premises of intoxicating liquors," and, while not pretending to be anything else, will be a demonstration of the fact that the business of the public-house can be conducted with general propriety and with comfort to all concerned. Those who know anything about public-houses, and those who have actually used them, know that this is not a new thing, and that the wholesale denunciation of all public-houses, because some of them are revolting places, is unjustified. For the benefit of persons who have been led to think that the lowest type of drink-shop is typical of all public-houses, we may commend a little book which has just appeared, describing fully the English public-house.[1] Mr. Selley does not enter the arena of controversy upon the drink question. He states that the main business of public-houses is concerned with the sale of intoxicating liquors, and then details the results of a long investigation into the various types of public-houses to be found in typical communities and localities, and into the uses made of them by their frequenters. The efforts towards reform made by "the trade" itself are set

[1] The English Public-house as It Is. By Ernest Selly. London: Longmans, Green and Co. 1927. Pp. 184. 5s.

out, and in particular the substitution in Carlisle of a large measure of State ownership for private ownership is shown to have been attended with obvious advantages. The book is written throughout with studious moderation, and the main conclusion come to is one which will receive medical endorsement. Acknowledging that trade in liquor must be a dangerous business, the author finds that the safeguards of laws and regulations set up by the community do not balance the pushing power of private profit-making. And while there are many well-managed public-houses, there is a preponderating quantity of drink-shops where no social attractions of any sort are offered, and where the inmates of the hospital and the burial ground are recruited.

VACCINE TREATMENT OF ENTERIC FEVER.

THE value of T.A.B. vaccine in prophylaxis is hardly in dispute. At the General Hospital in Rangoon Major M. L. Treston has continued his investigation of the effects of the injection of enteric group vaccine in the treatment of enteric fever.[1] His material consisted of 151 cases of enteric fever, but in the absence of controls it is difficult to gauge precisely the significance of the results. In this series there were five deaths which the author regards as less than might have been expected with other lines of treatment. In 139 cases the fever is said to have been curtailed but details are not given. The vaccine was injected hypodermically commencing with a dose of minims ii., increased at each injection by minim i. up to a maximum of minims x. The strength of the vaccine is not stated. Major Treston comes to the conclusion that vaccines are of undoubted use in the treatment of enteric fever in that they curtail the pyrexia, limit toxæmia, and prevent complications. The same conclusions in regard to the therapeutic use of enteric vaccines in the treatment of the enteric fevers are arrived at by Dr. K. D. Fairley in an article originally published in the *Medical Journal of Australia* and now republished in Vol. II. of the Collected Papers of the Walter and Eliza Hall Institute of Research, Melbourne. Dr. Fairley injected the vaccine intravenously for three or four days in succession, commencing with a dose of from 50–120 millions and working up to 200 millions. No ill-effects were noted in any case, not even in that of a boy of 14 who received 16,000 million bacilli in one dose by mistake. Analysis of the tables points to the conclusion that the treatment is of less value in children than in adults. Whereas in the adult series the total period of pyrexia is 26 days in the vaccine treated as against 36 days in the non-treated, the corresponding figures in the case of children are 34 and 30; and whereas in the adult series the death-rate is 7·5 per cent. in the treated as against 10·3 per cent. in the non-treated cases, in the case of children the corresponding figures were 13·3 in the treated as against only 6·7 per cent. in the non-treated cases. In this respect the author's figures hardly seem to bear out his conclusions.

SUPERFICIAL RADIUM THERAPY.

THE variation introduced by Mr. Hayward Pinch, the Director of the Radium Institute, in his series of annual publications makes each volume of independent practical use, while the series as a whole already covers most of the ground of radium therapy. This year all those maladies which affect the glabrous skin, mucous membranes or subcutaneous tissues, and respond favourably to exposures of Beta radiation of comparatively short duration, are discussed in a handy volume of 64 pages, divided into 14 chapters. Since knowledge of the histology of the skin and its appendages is essential to the correct appreciation of the pathological changes, a short description of the normal microscopical appearances is given, and the brief summary of ætiology and pathology which accompanies the clinical account of each condition will help the reader to understand the reasons for the duration and character of the exposures advised. Hypertrophies, new growths, and congenital affections of the epidermis occupy the first part of the book; new growths of the corium follow, and the other chapters are concerned with angiomata inflammations of the skin, affections of the hair and of mucous membranes.

Radium is said to be of great use in the early stages of Dupuytren's contraction; in favourable cases the fibrosis is greatly diminished, the contraction lessened or abolished, and complete extension of the affected joints rendered possible. The patient should be warned of the chances of recrudescence. As to capillary and cavernous nævi, some of the plates show excellent results in unsightly lesions which would obviously have been too large for successful treatment by carbon-dioxide snow. The cosmetic side of radium treatment is further exemplified in hypertrichosis in women. If the areas affected are extensive the treatment of the individual hair follicles by electrolysis is so tedious and trying that patients are apt to become disheartened and to refuse to persevere with the process. In such instances Mr. Pinch holds that it is justifiable to resort to radium, since excellent results are often obtained by its use. Treatment must be conducted with caution, otherwise telangiectases may appear later over the areas irradiated. Three exposures with applicators containing 0·25 cg. of element per square c.cm., screened with 1 mm. of silver should be given on each of three successive days, and repeated at intervals of from four to five weeks, three series of exposures in all being administered. The duration of each exposure varies from four to six hours, according to the density of the hair growth. A gradual atrophy of the hair follicles is thus induced; the hairs fall out and rarely if ever reappear. Phototherapy is more favoured by dermatologists than is treatment by radium in certain forms of tuberculosis of the skin, notably lupus vulgaris; but Mr. Pinch finds that small isolated patches which have proved resistant to other methods often respond well to radium. A bibliography concludes the handbook, which is published with the authority of the Committee of the Radium Institute, and will be supplied free to any medical man on demand.

Dr. H. H. Dale has been selected as a Crown nominee on the General Medical Council in succession to Sir Nestor Tirard.

A Congress of Tropical Medicine will take place in Cairo from Dec. 15th to 24th, and there will be found on p. 952 an account of the preliminary organisation. The Congress will deal with subjects ranging from diseases of temperate countries to those of a particularly tropical nature, and the sections include the whole range of medicine, surgery, and veterinary surgery. There will be an exhibition displaying the technical applications of art and science to the various branches of medicine. Conditions under which facilities of travel and reduction of fares are available can be obtained from Dr. Zeitoun, 32, rue Gay Lussac, Paris, and Dr. J. Khouri, 4, rue de France, Alexandria. The titles of communications intended to form parts of the sectional conferences must reach Dr. Zeitoun, with résumés, before Oct. 1st.

THE lecture on May 5th, in the course on Pathological Research in its Relation to Medicine being held at St. Mary's Hospital, will be delivered by Dr. Carl Prausnitz, professor of hygiene in the University of Breslau. The subject is Experimental Researches on the Nature of the Bacteriophage. Prof. Prausnitz has convinced himself that the bacteriophages are really living organisms preying on bacteria, and will set out the evidence which has led him to this conclusion. The lecture will be delivered at 5 P.M., in English, by Prof. Prausnitz, who was educated in this country. The lectures in this course are open to all members of the medical profession and to medical students without fee.

[1] Indian Medical Journal, October, 1926.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

CCXXI.—TREATMENT OF HAY-FEVER.

HAY-FEVER, as is well known, is a paroxysmal rhinorrhœa caused by a sensitiveness of the patient to grass pollen. This pollen affects the hay-fever patient in the eyes and mucous membrane of the nose and throat because only in these situations can pollen get into contact with his circulating blood. Grass pollen plus the serum of a hay-fever subject makes a poison-mixture for man, causing serous exudations and œdematous swellings in whatever tissue it penetrates; hence the symptoms of hay-fever. The pollen cross-fertilising the grasses is air- not insect-borne; it will travel many miles on light summer breezes and much further on a strong wind. In such a grassy land as England it is difficult to escape from the pollen cloud which covers the country from about May 20th until July 15th. These dates vary a little according to the weather and become slightly later as one travels northward towards Scotland; but the commencement and finish of the pollen varies less than one would expect because vegetative processes depend more upon daylight than upon temperature, and with the pollen cloud the hay-fever season begins and ends.

The specific diagnosis—i.e., that the paroxysmal rhinorrhœa is caused by grass pollen—may be made in two ways:—

1. The rhinorrhœa must coincide with the pollen cloud. If the symptoms begin much before May 20th or last much after mid-July, then either the case is not one of hay-fever at all or there is some other complicating factor which must be detected if successful treatment is to be given.

2. The disease can be produced artificially, but only in a hay-fever subject, by bringing a minute quantity of the pollen into contact with the sufferer's plasma. This can be done quite easily in the eyes, nose, or throat, or, indeed, any mucous membrane; but as a diagnostic test it is better to scratch down through the hard dry epidermis, say of the forearm or of the leg, and to place either pollen, or better still, an extract from pollen, on the abraded surface. Nothing will happen in a normal person, but the hay-fever patient will show within a few minutes a weal at and around the area of abrasion, and surrounding the weal there will be an erythematous blush. This constitutes the well-known skin reaction for hay-fever. It can be produced at any time of the year so long as a supply of grass pollen is available.

It follows from what has been said in the first paragraph that the serum of a hay-fever patient, when mixed with a little grass pollen, can be tried out as an urticarial mixture by injecting it into the skin of any normal man.

Treatment may be prophylactic or therapeutic. Prophylactic treatment consists (1) in avoidance of the pollen, or (2) in desensitising to grass pollen by inoculation.

Avoidance of Pollen.

The pollen grains are of considerable size, something like 20 μ; it is therefore possible—though seldom practicable—to filter the atmosphere of any room by arrangements less elaborate than those used in Prof. Storm van Leeuwen's "asthma chambers" in Leyden; cotton-wool is a sufficient filter. Even when no special precautions are taken, a quiet dust-free room, with windows closed, gives comparative freedom from pollen. The well-to-do sufferer can fly the country during the summer months, but it will need a good stretch of salt water to give absolute safety if the wind is blowing strongly off shore.

The amount of pollen, and therefore the intensity of symptoms, will be mitigated by (*a*) distance from a hay field; (*b*) any considerable altitude; (*c*) dull or showery weather; and per contra bright sunny weather, hay fields, river valleys, and travelling by railway or motor will increase the symptoms by increasing the pollen.

On special occasions—e.g., during a motor run in the country—the danger points can be protected: (1) the eyes by closely fitting goggles; (2) the nose by tufts of cotton-wool or small linen filters in the nostrils (both of these devices are very irksome); (3) the throat by strict nose-breathing.

Whatever the patient may try it is difficult for him to avoid the pollen and yet retain the common amenities of life.

Prophylactic Desensitisation (Leisurely).

(*a*) Prophylactic desensitisation can be made by subcutaneous injections of a grass pollen vaccine. The method which has been used since 1910 is to give weekly injections, commencing in March if possible, and continuing right up to the commencement of hay-fever when they must be discontinued or if necessary replaced by therapeutic (smaller) doses. For the purpose of measuring doses of pollen vaccine one "unit" is taken as equal to the amount of extract which can be obtained from one-millionth of a gramme *Phleum pratense* pollen. It is as well to begin the prophylactic course with some rather small dose, say from 10 to 60 units of pollen, according to the intensity of the hay-fever in previous years or judging by the skin reaction. From this amount the dose can be quickly increased at the weekly reinoculations till something between 200 units in the more sensitive cases and 500 units in the less sensitive is being given regularly. If after any of these inoculations there is a reaction in the patient—either pain at the site of inoculation, or still more important, a general urticaria, angioneurotic œdema, or asthma, then the dose is too large or has been increased too rapidly. In either event it is better to go back to a smaller dose, the optimum inoculation being a little less than that which causes a reaction. With reasonable care seriously unpleasant reactions are very rare and can be counteracted by subcutaneous injections of adrenalin—say 0·2 to 0·3 c.cm. of the 1/1000 solution. If a reaction is in doubt it is better to continue with the same dose till the doubt is settled.

Prophylactic Desensitisation (Intensive).

(*b*) In recent years an intensive course of prophylaxis has been in use, following the plan which has been so successful in dealing with other sensitisations—e.g., horse asthma. In this intensive course the injections are made every day or as frequently as is practicable and the dose is increased as rapidly as is compatible with the absence of reactions. This may in the end prove to be the more effective method because it more closely follows the daily needs and idiosyncrasies of the patient, and because it need not be started so early in the season. On the other hand, it makes more demands on the time of the patient and certainly more on the judgment of the inoculator.

Commencing with a safe dose—say from 10 units for the very sensitive to 50 units for the only slightly sensitive patient—the dose is increased by 50 per cent., or even 100 per cent. at first, and then by a less percentage as it gets larger or a general reaction becomes more feared. A pronounced reaction can be counteracted by an injection of adrenalin and is followed by a much reduced dose.

As an illustration of how the intensive course is likely to run, here is a hypothetical list of pollen injections. The patient is supposed to be very sensitive, therefore the initial dose is very small. One or two of the injections are supposed to have been overbold and the consequent reactions will be seen to have affected the succeeding doses. For a less sensitive person the initial dose might have been larger, the increase of doses perhaps more bold, the final doses considerably stronger, and, if necessary, the course might have been continued longer. May 1st is a

reasonable date for the commencement of an intensive course.

May 1st: 10 units; May 2nd: 20; May 3rd: 30; May 4th: 45; May 5th: 60; May 6th: 90 (strongish reaction, ∴ 0·25 c.cm. of adrenalin 1/1000); May 7th: 50; May 8th: 70; May 9th: 100; May 10th: 140; May 11th: 200 (slight reaction); May 12th: 200 (very doubtful reaction); May 13th: 200; May 14th: 250; May 15th: 320; May 16th: 400; May 17th: 550; May 18th: 700; May 19th: 850 (doubtful reaction); May 20th: 900; May 21st: 1100; May 22nd: 1300; May 23rd: 1500 units. Here a spell of fine weather is supposed to have started the pollen cloud and so have made any further *prophylactic* treatment imprudent for this very sensitive patient.

Therapeutic Treatment.

1. After the commencement of the pollen cloud specific desensitisation may still be practised, but as with other forms of vaccine therapy the doses must be much smaller than for prophylaxis; it may be impossible to give more than 2 to 5 units, it is seldom necessary or prudent to give more than 100 units for a dose. As in prophylaxis a "reaction" is to be deprecated. The size of dose must be estimated from (*a*) the sensitiveness of the patient as judged by his past history or from his skin reaction; (*b*) the condition of his eyes and mucous membrane at the time of inoculating; and (*c*) the reactions, if any, from past doses. The intervals between doses vary with their size from, perhaps, 24 hours with the very smallest up to, say, a week for the largest. This treatment has, in the writer's experience, failed dismally with some people, but with others has been so strikingly successful that they declare they will not be bothered with prophylaxis for the future.

2. Shock doses are as applicable to hay-fever as to any other of the asthma-urticaria group. If immunity is evolved in the business it is certainly non-specific for almost everything imaginable has been used as antigen: tuberculin, typhoid vaccine, peptone, milk, the patient's own blood reinjected intramuscularly, even sulphur emulsified in oil. The object is to cause a shock with a rigor or two, and in the writer's opinion the effect is by suggestion. The method is not popular and is not advocated here.

3. Polantin is an anti-pollen serum from immunised horses. Applied locally it gives temporary relief to slight symptoms, but seems unable to help the more severe cases. It is less used now than in former years.

4. Avoidance of pollen. This has been spoken of generally under prophylaxis. Lotions (e.g., warm normal saline) wash away pollen grains, and thick ointments protect the underlying mucous membrane but cannot be made to coat all the sensitive surfaces. Cauterisation substitutes cicatricial tissue for mucous membrane, and in skilled hands any specially sensitive spots can be treated in this way. Carbolic partly kills and partly anæsthetises the mucous membrane.

5. Anæsthetics will temporarily deaden the intolerable local itching, sprays of cocaine, morphia, anæsthesin, &c., may be instanced, but no medical man need be told the difficulties, dangers, and limitations of such treatment.

6. Adrenalin, to a lesser degree pituitrin, or any proprietary combination of these gland products, are in a class by themselves. They have a specific action on all the asthma-urticaria syndrome, checking the symptoms and affording instant though transient relief, whether injected hypodermically or applied locally. For hay-fever they can be administered as a spray of the 1/1000 adrenalin or a lotion containing a tenfold dilution of the same. Such applications seem to be free of bad after-effects and to lead to no "habit."

7. Suggestion treatment cannot be eliminated when dealing with any of the asthma-urticaria syndrome, least of all in hay-fever. It is well in the writer's mind that single doses of a pollen vaccine sometimes act miraculously in this way. It is more than probable that cauterisation of the nose, once so fashionable, owes much to this factor of suggestion. Anything associated in the patient's mind with cause or cure of hay-fever will act accordingly. There seems to be no evidence that an abnormal mentality plays any part in producing hay-fever.

For therapeusis small inoculations, as described in No. 1 above, are advisable, combined with any palliative treatments which may help, but in really serious cases strong prophylactic measures are necessary.

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Special Articles.

MEDICINE AND THE LAW.

Unusual Procedure in Court of Criminal Appeal.

AT its last sitting before the Easter vacation the Court of Criminal Appeal dealt afresh with the case of William Knighton who, as previously stated in this column, had appealed against a conviction for murder at the last Derbyshire Assizes. At the original trial the defence was insanity arising out of epilepsy. On March 21st the Court of Criminal Appeal was invited to substitute for the verdict of "guilty" a verdict of "guilty but insane." The Court declined to do this, and announced that, as the issue of insanity had been raised at the original trial, it would not listen to any fresh evidence of insanity but would leave that matter to be determined by the Home Secretary. Subsequently the case was reopened, the Home Secretary referring it back to the Court of Criminal Appeal under Section 19 of the Criminal Appeal Act of 1907. This unusual procedure did not amount to a re-trial of the case, but it gave the appellant a chance to produce new evidence. Section 19 of the Act says that nothing in the Act shall affect the Royal prerogative of mercy; it then proceeds to make the machinery of the Act available in two cases for the purpose of disposing of petitions for the exercise of that prerogative. The Secretary of State under the section may, upon a petition for mercy, do either of two things. First, he may refer the whole case to the Court of Criminal Appeal to be heard and determined as if it were an appeal under the Act in the ordinary way. This alternative was not possible in Knighton's case as his appeal had been before the Court of Criminal Appeal already. Secondly, the Secretary of State may refer to the Court any point on which he desires assistance. It was under this latter power that the Home Secretary acted. The appellant's new evidence—that of his sister—was produced but was not accepted by the Court; the appeal was therefore dismissed a second time. Nothing was said to disturb the practice of the Court of Criminal Appeal in respect of its refusal to hear any fresh evidence on appeal if that evidence relates to the defence of insanity and if the issue of insanity has been raised by the defence at the original trial. The Court of Criminal Appeal is evidently unwilling to listen to a succession of mental specialists in murder appeals; it leaves the issue of insanity to the Home Office experts. Its practice in this respect is, however, open to criticism in that it discriminates against the reception in court of a particular kind of evidence—namely, evidence of insanity—and thus leaves the appellant to take his chance before a departmental rather than a judicial tribunal.

Law Reports and Recent Restrictions.

Knighton's case illustrated the recent restriction upon the publication of law reports. In the course of her statement, the appellant's sister gave certain evidence of a sexual character. The *Times*, in its report, remarked that part of this statement appeared to be within the intention of the recently passed Judicial Proceedings (Regulation of Reports) Act; this part was, therefore, excluded from the report. It may seem strange that a law report in the *Times* should be affected by the recent Act, seeing that the Act has a saving clause in favour of bona fide law reports and seeing that the *Times* reports are all written by barristers and are accepted in all English courts as of full and proper legal authority. But the Act is so worded as to protect only two classes of law reports; one class includes any publication of a technical character bona fide intended for circulation among members of the legal or medical professions; the other class includes any matter in a separate volume or part of any bona fide series of law reports

which does not form part of any other publication and which consists solely of reports of proceedings in courts of law. Thus the law reports in the columns of a daily newspaper, however carefully, authoritatively, and unobjectionably prepared and printed, obtain no protection. The omission was not a serious matter in the case under discussion, since the Court found the evidence unworthy of belief, but cases may arise where such omissions may be unfair to one of the parties as well as destructive of the value of the report of the proceedings. Admittedly the Act was imperfectly drafted. It contains, for instance, a list of the sole particulars which may be published in reporting a divorce case. The names of the parties and witnesses may be reported but not, apparently, the names of judge, counsel, or solicitors; the apparent omission of the judge's name is the more remarkable since his summing-up may be given in full.

SCOTLAND.

(FROM OUR OWN CORRESPONDENT.

Over-prescribing under the Insurance Acts.

WHERE the fund is limited every reasonable care must be taken to get full value for the money spent. This is all that the "checking bureau" means. It has worked in Scotland with much success from an early stage in the organisation of National Health Insurance. But there has been, from time to time, much heart-burning. It is not an agreeable duty for a practitioner to sit in judgment on his fellow practitioner's prescriptions, and I have never heard that any local panel committee enjoyed the job. Yet there is no doubt whatever that the general effect of the checking system and the frequent inquiries by the doctors and officials concerned in the administration of medical benefit has been to improve the level of prescribing. Probably over-prescribing—which simply means the use of expensive drugs when equally good but cheaper drugs are available—is largely due to defective teaching. It must be embarrassing when a professor charged with the scrutiny of prescriptions finds that some of his own favourite prescriptions are among those pilloried as "excessive" by the checking bureau. But the explanation is simple. Whilst the expense of a drug bears no relation to its therapeutic effect, nevertheless, if "panel" work is an integral part of our domiciliary medical service, the question of expense is very relevant to practice. Recently efforts have been made to bring before the medical profession the methods of avoiding expense by selection of drugs, and by careful attention to quantities dispensed, but obviously there is a recurrent irritation among the insurance practitioners. It is reported that appeals "against fines amounting to £370 are to be made by eight of 13 Glasgow panel doctors who were surcharged following allegations of over-prescribing." It is sometimes said that insurance patients get one quality of drugs and private patients another; no such distinction is involved in any regulations under the Insurance Acts. Whether the machinery for investigating so-called over-prescribing is the best for its purpose is another question. The original intention was to enable the medical men themselves to act as checkers of each other's prescribing.

Nursing at a Maternity Hospital.

Although an amalgamation of the Simpson Memorial with the Royal Infirmary has been arranged, the new accommodation cannot be ready for some seven years. Meanwhile the work must be carried on and there is an acute financial difficulty, the main immediate cause of which is a change in the period of training for midwives. This has caused a marked falling off in the supply of pupil nurses, and in order to maintain the nursing staff even at a minimum standard it has become necessary to offer free training to pupil nurses who have had their general training. Hitherto pupil nurses have paid fees and the giving of free training to the majority of its pupils will mean an actual and immediate loss to the Edinburgh Maternity Hospital of £2000.

Prof. George Robertson, President of the Royal College of Physicians of Edinburgh, at the recent meeting of the hospital dealt with some fundamental points of hospital administration. Everyone, he said, would approve of the directors' decision to give free training to all pupil nurses who had already had their general training. He wished to bring home to the public the fact that the great voluntary hospitals did not pay probationer nurses adequately for the services they rendered. It was true that they were being trained, but they were also working hard all day and all night long to keep the hospital running. The whole machinery would stop if the probationer nurse did not work, and for those services she was entitled to payment, and to more adequate payment, than she got at present.

Prof. Robertson's speech has aroused great interest.

The Aberdeen Royal Infirmary.

The Aberdeen Joint Hospitals Scheme has advanced another stage. Last week, at a meeting presided over by the Lord Provost, a motion was carried unanimously authorising the board of directors of the Royal Infirmary to acquire forthwith the part of the Forresterhill site allocated under the scheme, and to take all necessary steps towards the erection of a new infirmary upon it. The Lord Provost said that they were appealing for the sum of £400,000, and already he had received before the appeal had been issued £212,000. He had gone into the cost of the infirmary part of the scheme with Mr. William Kelly, who assured him he would be able to carry out the work at a cost of about £500 per bed, fully equipped, and that would mean that the total cost of the infirmary section would be £257,000.

Mr. Kelly was the architect who, 36 or 37 years ago, planned the expansions of the present Royal Infirmary. He is known as one of the most distinguished of Scottish architects, and it is recognised that the people of Aberdeen reach their objectives without wasteful expenditure; but I cannot help thinking that £500 a bed is a very sanguine estimate in view of experiences elsewhere, even allowing for the fact that the conditions as to site are exceptional.

VIENNA.

(FROM OUR OWN CORRESPONDENT.)

Prof. Michael Grossmann.

THE medical teaching staff of Vienna University has lost one of its most esteemed members in Prof. Michael Grossmann, who has died at the age of 78. Professor for diseases of the throat and nose, and one of the leading specialists in his time, he was at first a surgeon, being assistant to the famous Billroth, and later to Schrötter, who in the 'eighties made his clinic famous for the development of laryngology. Here Dr. Grossmann investigated a large series of pathological conditions and published reports and papers on emphysema, on blood pressure in the lungs, on "nasal asthma," and on the laryngeal nervous system: further, he was active in organising the medical service on railways, for which he wrote a very instructive book, since translated into many European languages. He withdrew from public life some eight years ago.

The Liver-Fluke in Austria.

Liver-rot is not a common disease among the livestock of this country, but is now prevalent in the eastern provinces of the Republic. It is caused by the liver-fluke (*Distomum hepaticum* or *Fasciola hepatica*) which is about one inch long, a quarter of an inch broad, and has two "mouths," the second one on the ventral side of the body, and both acting as suction organs. The infection of the cattle takes

place by means of the food or water; in cattle and in man it is found chiefly in the liver, in the biliary ducts, to which it is carried by the portal blood. In rare cases the parasites may lodge in the pulmonary tissues also. In man the characteristic symptoms are icterus and painful swelling and enlargement of the liver, with pyrexia and diarrhœa, and suppuration may occur. Examination of fæces reveals the characteristic ova. In the present outbreak three cases proved fatal before the correct diagnosis was made. Treatment by male fern is said to be effective.

Use of "Antivirus" in Suppurative Conditions.

The interesting researches of Prof. Besredka, from the Pasteur Institute of Paris, are controlled very strictly in Vienna and favourable results obtained with his antivirus have now been published here. Before the Vienna Microbiological Society, Prof. Lehndorf and his collaborators recently reported on their results. The antivirus was tested by surgeons, gynæcologists, urologists, dentists, otologists, and dermatologists. They all recorded unusually good results in various suppurative conditions. Abscesses, infected wounds, acute otitis, ulcerations of the cornea, burns, scalds, phlegmons, ulcerations in the mouth and nose, and varicose ulcers were treated either by painting the affected parts with antivirus or by washing and packing with gauze dipped in it. Lehndorf maintained that the first marked symptom is the disappearance of pain. The favourable results seem indisputable, although no explanation of the action is yet forthcoming. Amongst the patients were medical men whose testimony was unanimously favourable, so that Besredka's method is sure of general trial.

The Allergen-free Chamber.

Prof. Storm van Leeuwen on April 12th read a paper before the Biological Society of Vienna on Allergy and Climate. His researches on the supersensitiveness of the skin and mucous membranes have convinced him, he said, that the effects of certain materials, like pollen, dandruff, purin bodies in the food, or bacterial protein are not sufficient to explain all forms of asthmatic attacks or urticaria. He has found that the allergic diseases are present in some parts of Holland more than in others; even in the same house the effects are different in different rooms. Therefore he was led to suspect that certain bodies, called by him "allergens," are present in the air or in climate as a whole, to which asthmatics are supersensitive. The absence of attacks of asthma in persons subject to the disease, when living in high altitudes, the disappearance of eczema after a change of domicile, the impossibility of obtaining a cutaneous reaction for the known allergens in many asthmatics, who at once got well when they left their home, proved, in his opinion, that the air of some places must contain allergens. He considers that 90 per cent. of all asthma is a climatic disease. He therefore resolved to let his supersensitive patients live in an air free from the unknown allergens. He had an air chamber constructed, into which air was pumped, completely purified and filtered, like the pneumatic chambers for the treatment of chronic bronchitis. The results were striking, for 76 per cent. of the asthmatics became completely fit for work, and 14 per cent. were more or less benefited. Of the 10 per cent. who showed no improvement, it was held that their asthma was not due to climatic allergens. Asthmatic subjects at Davos showed, he said, about the same results. The investigations indicate that if asthmatic persons only sleep in an allergen-free chamber they can proceed with their daily occupation. Other patients subjected to tests in such chambers were benefited. Children with whooping-cough at once had marked relief in the chamber, and the symptoms of tuberculous patients were alleviated. With regard to the last, Prof. Storm van Leeuwen stated that such patients showed a distinct drop of temperature, increase of body-weight and appetite, a marked diminution of sputum and coughing—i.e., the same results as are found after residence in high altitudes. Allergen-free chambers are to be installed and tested in the Vienna clinics, and the simplicity of their construction will make prompt and extensive investigation, properly controlled, possible at clinics and institutions.

A few days ago Prof. Karl Lindner, at present chief of the eye department of the Vienna Poliklinik, was appointed to the chair of ophthalmology in the University of Vienna, vacant for more than a year. Lindner, a Vienna man, has worked strenuously at refraction problems and ophthalmological surgery, his researches on blennorrhœa and trachoma being well known. It is understood that the Senate of the Medical Faculty presented to the Board of Education three other older and perhaps better known candidates, but the choice fell on the younger man, and a "rejuvenation" of the particular studies, it is hoped, will follow.

PARIS.

(FROM OUR OWN CORRESPONDENT.)

The Tuberculin Skin Reactions.

THE cutaneous tuberculin reaction has often been investigated for urban populations, both in France and abroad, but for rural districts there are only the statistics of Burnet in this country, dealing with 77 people living in a sea-coast village, and those of Hillenberger and Römer in Germany. During the past seven years Dr. Phelebon, of Montrichard, has investigated the skin reactions of country people living in Touraine, with reference to the age when a positive reaction, indicating that primary infection has occurred, first makes its appearance. It is well known that this happens as a rule in early childhood; Marfan found that, at the age of 5, 53·6 per cent. of children gave a positive test; so that Dr. Phelebon was surprised at the results which he obtained. He tested 3182 subjects of both sexes, ranging in age from one day to 25 years, all of them apparently free from tuberculosis. Only in 883 (27·74 per cent.) was the reaction positive, and in persons below the age of 18 the percentage of reactors was only 7·29. From 18 to 19 years of age it rose to 24·63, and then in the following two years to 42 per cent., after which it continued to increase until at 25 years of age it stood at 61·65. Apparently, therefore, the positive skin reaction generally appears in country people after the age of 19; this is the time at which they are apt to come first in contact with the towns and to stay repeatedly or for long periods away from their villages. About 50 adults were tested whose ages were between 25 and 40, and amongst these the percentage of positive reactions was 62.

Injury Caused by Aniline Pencils.

An increasing number of cases is reported in which the hand and fingers have been injured by pricks or by penetrating wounds made by aniline pencils, the injury being greatest when a fragment of the coloured material remains within the tissues. Hitherto cases have only been reported from Austria and Germany, but in the *Presse Médicale* for April 13th Dr. Iselin describes one in France. Unless adequate treatment is given the dyes are apt to produce necrosis and fistulæ. This can only be prevented by radical ablation, not only of the aniline fragment but of all coloured tissue; a simple vaseline dressing may then be applied.

French Village Sanatoriums.

Dr. Martin, physician to the dispensaries of the Seine-et-Oise Department, has pointed out some interesting distinctions obtaining between English and French sanatorium systems. For example, the French cottage system at Passy-Praz-Coutant in Savoy has been confused with the English village of

Papworth. The two are not identical. The French village deals with tuberculous patients of the middle class, its cottages permitting grouping according to occupation or mental and intellectual preference, whereas Papworth provides for patients of rather lower social standing and does much to solve their economic difficulties. No French sanatorium for tuberculosis is really comparable to Papworth. The Passy Institution is more closely similar to the American cottage sanatorium at Saranac Lake.

The Paris Birth-rate.

The latest municipal bulletin shows that the number of births in Paris has remained stationary between 1922 and 1926, although the population has considerably increased. From 19 to 21 per cent. of the infants born in the city are placed with nurses and artificially reared. Stillbirths are diminishing here as indeed throughout France, but mortality during the first few months of life remains high, partly because of the transference of infants from mother to nurse.

The centenary of Villemin will be celebrated in October. He was professor at the Val-de-Grâce Hospital in Paris and was the first to prove that tuberculosis could be conveyed by inoculation, thus laying a foundation for the work of Koch.

Yacoël and Boyer recently showed at the Académie de Médecine a case of chronic obliterative arteritis cured by the use of insulin. This condition so often leads to gangrene of the limbs that it is encouraging to hear of numerous successes attending treatment with insulin as given under Prof. Vaquez at the Hôpital de la Pitié. It is suggested that the disease has its origin, not in microbic infection as has sometimes been believed, but in a trophic disturbance related to abnormal function of the endocrine glands —notably of the pancreas and suprarenals.

Dr. Paul Marie Léon Regnard, who died recently at the age of 76, was a member of the Academies of Medicine and Agriculture, and had made experimental investigations into the physiology of respiration. His many writings included works on epidemic affections of the mind, on life in the sea, on cure by altitude, and on rescue work in mines. He was also the author of numerous papers on the anatomy, physiology, and chemistry of agriculture.

WINDSOR HOSPITAL EXTENSION.—The King last week opened a new wing, named after him, of the King Edward VII. Hospital at Windsor. There are now 50 beds for men, 40 for women, 20 for children, and 15 private wards for patients of small means. It will still be impossible to meet the demands of a wide area, and it is therefore intended at an early date to provide a nurses' annexe to release rooms in the main buildings; these rooms will be converted into additional private wards and will make it possible to increase the number of beds for women and children.

THE LATE DR. W. T. BLACKLEDGE.—The death took place on April 20th of Dr. William Thomas Blackledge, M.B.E., at his house in Liverpool, where he had practised in the Newsham Park district since 1893. He was the second son of the late William Blackledge, of Chorley, and studied at Edinburgh at the University and extra-mural school, graduating in 1893, having previously taken the L.R.C.P. & S. Edin. in 1888. At the University he gained the Junior Mackenzie Bursary in 1885, and the Senior Bursary a year later. He also acted as a prosector in the anatomical department under Sir William Turner. For over ten years he was assistant surgeon to the Liverpool Police Force and for many years also honorary assistant surgeon to the Liverpool Hospital for Cancer and Skin Diseases. An able and enthusiastic Volunteer and Territorial officer he joined the 3rd West Lancashire Brigade, R.F.A., as surgeon-lieutenant in 1899. In 1911, on the formation of the Territorial Force, he took a combatant commission, and in 1913 was transferred to the R.A.M.C., becoming second in command of the 2nd West Lancashire Field Ambulance, with which he was serving at the outbreak of the war. During the war he was in charge of military hospitals in Kent, and subsequently commanded the 2/1st West Lancashire Field Ambulance, holding the rank of lieutenant-colonel. Later he was president of the Officers' Medical Board in Liverpool.

Public Health Services.

A POPULAR SKETCH OF THE AMERICAN PUBLIC HEALTH SERVICES.

Two recent issues (Feb. 4th and 11th, 1927) of the Public Health Reports, issued by the U.S. Public Health Service, have been largely given up to an account of the many activities of this service written in a popular style which will appeal to a much wider circle of readers than the body of workers for which it is primarily intended. The service enlists the aid of medical and other specialists of every description, and its staff includes bacteriologists, zoologists, pharmacologists, and chemists. Its functions are mainly research and the setting of a high standard for the inspiration of the various States and local government authorities. Every health problem comes within its purview and the description of the investigation of diseases is a tale of high endeavour, not unmixed with martyrdom.

Rocky Mountain Spotted Fever.

This disease, which attacks the shepherds of Idaho and Montana, had a case-fatality of 80 to 90 per cent. in Bitterroot Valley. During the investigation a doctor and two assistants working at the Montana laboratory acquired the disease and died within ten days of infection. The disease occurs among small rodents and is passed on to other rodents and man by ticks. The rodents are not much incommoded by the disease, but are capable of infecting the ticks, which feed on them, for about ten days. A vaccine has been prepared from an emulsion of infected ticks and found efficacious for animals. In 1924 Dr. R. R. Spencer took the first dose administered to a human being. Subsequent results indicate that the vaccine is an effective protection to the shepherds who have been vaccinated. Among the laboratory workers, before the vaccine was used, there were five infections, all fatal. Since the use of the vaccination there have only been four very mild cases which included a man over 60—the first person of that age to recover after infection with the "Bitterroot" strain.

Tularæmia.

Tularæmia has been known in Utah and adjacent States since 1910 as "deer-fly fever." It begins with an ulcer and feverish symptoms resembling typhoid fever and is apt to cause long disablement of the farmers in the busiest time of the summer. It may be fatal, although most patients recover. Six workers at the main laboratory at Washington and six more at the Montana laboratory contracted the disease but fortunately all 12 recovered. In 1910 Dr. G. W. McCoy, of the service, discovered a "plague-like disease of rodents" among the ground squirrels of Tulare County, California. This has now been identified with the Utah disease, which is found to be transmitted to man from wild rabbits by flies and ticks. One attack gives immunity and the effort to discover a vaccine is being prosecuted by laboratory workers protected in this manner. Infected ticks pass the infection through their eggs to the next generation of ticks. An infected rabbit is harmless as food after cooking. It is suggested that laboratory workers and persons who dress rabbits can protect themselves by wearing rubber gloves. Tularæmia has now been recognised in 28 of the States and identified as a disease known for several years in Japan as "Ohara's disease."

Undulant Fever.

Malta fever was unknown in the United States until 1905. In 1922 an outbreak of 35 cases in Arizona was traced to goat's milk and in the same year a case in Johns Hopkins Hospital was traced to cow's milk. It reads like a romance how the twins *Micrococcus melitensis* (foster father Bruce, Britain) and *Bacillus*

abortus (foster father Bang, Denmark) were brought together by Miss Alice Evans, of the Washington laboratory, in 1918 after two decades of separation. Contagious abortion "is so prevalent among cattle that there is little chance for anyone to drink unpasteurised milk for any considerable length of time without ingesting the organism which may cause Malta fever."

Malaria.

Malaria has been chiefly tackled in the United States hitherto by drainage and oiling operations, but during 1926 successful experiments were carried out in Virginia by the use of Paris green dusted from an airplane, and it is thought that this method of destroying the malaria mosquito may be applied to large areas at a reasonable cost. Another scheme in progress is the study of the habits of the salt-marsh mosquitoes with a view to reclaiming millions of acres in the South Atlantic and Gulf States at present rendered uninhabitable by hordes of these biting insects which, as far as is known, do not carry specific diseases.

Other Infections.

An organised scheme to fill in the gaps in our knowledge as to how tuberculosis is spread, the perfection of scarlet fever antitoxin, the researches into leprosy in Louisiana, Hawaii, and the Philippine Islands, and the investigation of a mild form of typhus fever known as "Brill's disease," endemic in New York and some eastern cities, are other matters dealt with in these articles.

Cancer, goitre, industrial diseases, social diseases, nutritional diseases (especially pellagra, which is quite common in the Southern States), and milk-borne diseases are all being studied. An endeavour is being made to establish a uniform standard for clean milk production throughout all the States.

Child hygiene, rivers pollution, rural sanitation, statistics, and health administration are other matters receiving attention, and the magnitude of this part of the problem is suggested by some figures given—e.g., between 85 and 90 per cent. of the sewage of all the cities in the United States is discharged without treatment into the most convenient stream; 84 per cent. of the rural population are still without the protection afforded by a local full-time health service; 40 per cent. of the 100 largest cities have part-time health officers, and "in nearly 30 per cent. appointment of personnel is still disturbed by political changes in the city administration"; only 79 of the 100 largest cities were in the birth registration area in 1924.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED APRIL 16TH, 1927.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 348 (last week 391); scarlet fever, 1169; diphtheria, 709; enteric fever, 33; pneumonia, 993; puerperal fever, 33; puerperal pyrexia, 84; cerebro-spinal fever, 16; acute poliomyelitis, 1; acute polio-encephalitis, 3; encephalitis lethargica, 33; continued fever, 1; dysentery, 6; ophthalmia neonatorum, 114. No case of cholera, plague, or typhus fever was notified during the week.

The cases of small-pox were notified from the counties of Derby, 6; Durham, 172; Lancaster, 1; Northumberland, 18; Nottingham, 8; Yorks, North Riding, 2, West Riding, 94—all north of the Midlands; and Monmouth, 47. Since this return was made up 6 cases have been reported from the County of Middlesex—2 of these from a laundry in Hendon and 4 from a single household in Golders Green.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox, 3 (1) from enteric fever, 89 (2) from measles, 6 (3) from scarlet fever, 65 (19) from whooping-cough, 30 (7) from diphtheria, 39 (9) from diarrhœa and enteritis under two years, and 96 (12) from influenza. The figures in parentheses are those for London itself.

Correspondence.

"Audi alteram partem."

CREAM IN INFANT FEEDING.

To the Editor of THE LANCET.

SIR,—Dr. Donald Paterson, in his article under this title in your issue of April 23rd, refers to diets with a high fat content which are often given to infants. He points out that quite a number of children are unable to manage a high fat-content in their feed, and estimates these as being 1 in 10 of the population. I think he might have gone further than this and referred to the number of children who have a difficulty in the digestion or absorption of fat, even when present in the diet in inadequate amount.

This fat intolerance is sometimes present in the breast-fed child, although it must be remembered that the fat in breast milk is occasionally found to be in excess of the normal, in which case the trouble is really due to too rich a milk. In the case of the artificially fed child the tolerance, or rather the intolerance, of fat is a very common difficulty, and the child's digestive system has to be educated to deal with fats by giving them in small, gradually increasing quantities, and working slowly up to the maximum of about 3·5 per cent. in milk mixtures. In addition care should be taken to supply the most valuable kind of fat both from the point of view of its vitamin and nutritional value and also to give these fats in a form in which they can be most readily assimilated.

Dr. Paterson refers to certain synthetic creams, among which he names New Zealand cream, and he makes the observation "that these creams are of great value to the infant apart from their vitamin-content is most debatable." He advocates in place of such synthetic creams the use either of a cod-liver oil emulsion or "a few drops of plain cod-liver oil three times a day immediately before feeds." In my experience, plain cod-liver oil is not so easily tolerated by the child who has a difficulty with fat digestion as an emulsified fat, and for this reason there is a distinct advantage in using a fat emulsion rather than the plain oil. New Zealand cream made under the direction of Sir F. Truby King is especially designed to provide the right kind of fat in the most easily digestible form; it contains 50 per cent. fat of which two-thirds is animal oil, including fresh New Zealand butter and cod-liver oil, and one-third vegetable oil, mainly pea-nut; it also contains 40 per cent. sugar, mainly dextrose and a little lactose. The presence of the vegetable oil renders the absorption of the animal oil easier, and of this, I think, there is no doubt. I have used New Zealand cream in such a very large number of cases that I am quite convinced of its value, but I should like to take this opportunity to point out that if this cream is used it is of the utmost importance to give only a sufficient quantity to supply the correct maximum of fat in the diet, and where a child has only been accustomed to a low fat, or in the case of a fat intolerance, it is essential to begin with a small quantity and gradually work up to the full amount required for the 24 hours' supply. I am aware that children have been upset by the incorrect use of this cream and so faults have been unjustly found with it. Recipes for the proper use of it in milk mixtures may be obtained from the Mothercraft Training Society.

I quite agree that it is a common mistake to keep children too long on an exclusive milk diet, and that milk is often given to the older child in too large quantities to the exclusion of the solids which it requires. But does Dr. Paterson really believe that there is quite sufficient fat or cream in "an ordinary diluted cow's milk feed" without any further addition? I should like to know what he means by "an ordinary diluted cow's milk feed." He contradicts himself in his next sentence when he says that every infant, breast or bottle-fed, should be given

cod-liver oil. Is it necessary or even advisable to give cod-liver oil to a breast-fed child unless it is proved that the mother's milk is deficient in fat, or that her diet is lacking in animal fat? Would it not be better even in these cases—which must be rare—to give the cod-liver oil to the mother rather than to the child?

As to whether fat is needed rather for its vitamin-content than for its food value is a question which we must look to the physiologists to determine, but until we are better informed surely we must believe that it is of value from both these points of view. What would be the effect on nutrition and growth of a fat-free diet plus an extract of the fat-soluble vitamins if such an extract could be prepared?

I am, Sir, yours faithfully,

REGINALD C. JEWESBURY.

Wimpole-street, W., April 25th, 1927.

ANTERIOR SUBLUXATION OF THE ATLAS.

To the Editor of THE LANCET.

SIR,—Mr. Alwyn Smith and Mr. Lambert Rogers seem to me to be entirely right in their criticism of Prof. Oppel's interesting case. I have assembled a considerable amount of material on this and allied lesions of the upper cervical vertebræ which I hope to have ready for publication shortly. It is evident that the dislocation is a sign of some other injury. This may seem an obvious statement to make, since dislocations in general are due to violence which has ruptured the ligaments holding the bones together, and usually continued long enough to displace the bones. In this particular region immediate recoil into normal position may take place, and dislocation occur later, even intermittently, by means of the forces of gravity or muscular action. In the case of the occipito-atlanto-axial component the dislocation is the end-result usually of a fracture of the odontoid process or of rupture of the transverse ligament. Prof. Oppel correctly remarks that the former—i.e., odontoid fracture—is the commoner, much the commoner. In his case we may assume that the odontoid has not broken through at the neck. There is, however, another horizontal fracture of the axis (I shall refer to the distinction between horizontal and vertical fractures of the axis in a forthcoming paper) which is more difficult to diagnose, and therefore escapes notice more often even than the more common varieties. I may remark in parenthesis that the most potent reason for failure to diagnose them is implicit in a remark of Prof. Oppel's: "And what surgeon does not know that the history of anterior subluxations of the atlas is one of sudden death caused by trauma? The number of patients who have not succumbed to such a lesion may be counted on the fingers." With the greatest respect to Prof. Oppel, who has done much for the cause of surgery, I must strongly disagree with this statement, which does, however, embody the general impression of our profession towards injuries. Medical men feel that any case of their own cannot possibly have an injury involving atlas or axis because the man is still alive! Hence a number of cases are missed. Of course, if a complete luxation occurs death must result, but this is a great rarity. A subluxation, such as Prof. Oppel describes, is much the commoner, and even when untreated these do not as a rule become complete luxations unless the cause of the displacement is disease in the bones and ligaments (i.e., pathological dislocations).

The second variety of axis fracture to which I commenced to refer is an oblique fracture downwards and forwards through the body of the bone, and this may liberate the odontoid and allow an anterior subluxation to occur. In these cases the neck of the odontoid resists fracture, but a considerable fragment of the axis comes away with it. The antero-posterior view through the mouth usually fails to reveal a clear fracture line, and all that one sees distinctly is that the odontoid is intact. Even in the lateral view the fracture may be difficult to make out. The presence of a bone fragment in front of the axis suggests that this may have been the pathology of Prof. Oppel's case. To be sure the fragment may have been displaced downwards at the operation, and may even be adventitious, as it was not seen in the first photograph.

I do not think that Prof. Oppel is justified in his diagnosis of fracture of the anterior arch of the atlas. Judging from the tracing the appearance of the anterior arch is not abnormal. I doubt whether a fracture of the anterior atlantal arch will often be diagnosed during life, for it is difficult to see clearly except in profile. There is certainly no reason why it should be dangerous. Most of the few published "fractures" of the anterior atlantal arch are developmental defects. I have commented (*Brit. Jour. Surg.*, 1920) in a paper on Atlas Fractures on a very beautiful example published by Sybenga (1919).

I agree with Mr. Alwyn Smith and Mr. Rogers that laminectomy would be the better operation, perhaps combined with removal of the posterior margin of the foramen magnum, if the patient had pressure signs and the displacement had occurred for so long that one was afraid of manipulation. The ideal operation, however, is unquestionably replacement and fixation, the latter not by means of an Albee graft, as Prof. Oppel tentatively suggests. A successful graft must lie in an osteogenetic medium, and although it might "take" below in the rongeured and split lower cervical spinous processes, I cannot imagine its uniting above to the occipital bone, with its feeble powers of bone formation. The alternatives lie between an arthrodesis in the atlanto-axial joints, or slinging the posterior arch of the atlas to the tunnelled spine of the axis by strong fascial grafts or slips from the tendo Achillis—much the easier procedure.

I am, Sir, yours faithfully,

Manchester, April 15th, 1927. GEOFFREY JEFFERSON.

BROMSULPHALEIN.

To the Editor of THE LANCET.

SIR,—In a recent leading article (THE LANCET, Feb. 19th, p. 400) dealing with liver function tests and their clinical value, reference was made to an article by Dr. Ernest Bulmer (*Quart. Jour. Med.*, 1927, xx., 101) upon the bromsulphalein dye test. Bulmer was unable to obtain satisfactory results with this test, and in normal individuals he obtained widely divergent results, not at all agreeing with the standards we have set. Thus we have found that in normal cases after an intravenous injection of 2 to 5 mg. of bromsulphalein the liver is completely able to remove the dye from the blood within 30 minutes. Bulmer, however, in his series of normals, reports retention of the dye in the blood, up to 45 per cent., 30 minutes after its injection. The reliability of a test of this nature depends primarily upon a constancy of findings in normal individuals, and in view of the fact that in a large series of investigations we have never encountered a single exception to our "normal" standards, Bulmer's work deserves further criticism.

The explanation of Bulmer's results apparently lies in the drug which he used. Bromsulphalein was synthesised in the laboratories of Hynson, Westcott, and Dunning, Baltimore, Md., by Dr. E. C. White. Its preparation is difficult and the technical details of its manufacture have not yet been published. The dye employed by Bulmer was obtained from a local chemist, and Dr. White states that it would be practically impossible to make bromsulphalein from the information at present available. Bulmer was probably not using bromsulphalein, and it seems advisable to correct the erroneous impression of this test which his work conveys. Numerous workers have demonstrated the superiority of the dye test (based upon its removal from the blood stream) over carbohydrate tolerance tests, and in chronic liver disease this test is often the only method which will reveal impaired function.

I am, Sir, yours faithfully,

SANFORD M. ROSENTHAL.

Department of Pharmacology, McGill University, Montreal, March 31st, 1927.

THE RESULT OF AN APPEAL.

To the Editor of THE LANCET.

SIR,—My appeal on behalf of a doctor, published in your issue of Dec. 4th last, brought in a sum of £114 19*s.* 6*d.* This is additional to the subscription with which the list was opened. Will you and the 42 subscribers please accept my thanks.

I am, Sir, yours faithfully,

Harley-street, W., April 23rd, 1927. HILDRED CARLILL.

TESTS FOR DRUNKENNESS.

To the Editor of THE LANCET.

SIR,—May I trespass further on your space to make a few observations on Sir William Willcox's letter. In the first place I should like to ask for the source of the evidence which proved conclusively to the Committee "that in the performance of complex occupational acts such as the driving of a motor-car an experienced driver might be little affected by relatively large amounts of alcohol since his long experience of driving has caused his control of the car to become almost automatic." More particularly I wish to know why the Committee conclude that the judgment of the alcoholic is little impaired, for this matters just as much as having complete control of the levers of the car. A friend of mine accustomed to alcohol in a concentrated form (he has got to the stage when he prefers his whisky neat) tersely and candidly states the difficulty when he says that he gets home more quickly in his car after a few whiskies at his club than when the drinks are omitted till he gets home. Then as to Sir William Willcox's observations on the legal objections to the test—I have never advocated taking blood samples; in fact, in the paper I stated that there are obvious objections to the direct method of obtaining the blood concentrations by taking blood samples, &c. If the accused person is unwilling to pass a urine sample I think this should be used in evidence against him.

It is refreshing to learn that Sir William Willcox admits the legal value of the chemical proof of absence of alcohol from the urine of a person arrested for drunkenness. But why restrict the value to a negative result only? Even if it be not admitted that there is a correlation between concentration of alcohol in the urine and toxic symptoms produced (I think that those who will actually test this out for themselves will agree with me, however, that these factors are related) surely it will be of service to the presiding magistrates to be able to state from a quantitative analysis of the urine that the accused must have taken at least so much alcohol? A case in point came to my notice some months ago; a motorist, after zigzagging on the wrong side of the road, grazing a tram-car and knocking a cyclist down, then took a tram standard head on, with the result that the impact flung him violently against the steering wheel and he fractured some ribs. The injury caused a delay of some weeks in the trial—he was arrested for being drunk in charge of a motor-car. The police surgeon who saw him three-quarters of an hour after the accident considered him not drunk at that time. His urine was sent me for analysis. It contained 268 mg. alcohol per 100 c.cm. This man must have drunk at least the equivalent of the alcohol in six large whiskies (i.e., 7½ oz. whisky 30 U.P.) to produce this concentration, and yet the accused on oath stated he had had only one gin to drink, which will yield a maximum concentration of alcohol in the urine of not more than 50 mg. The man was simply fined for negligent driving!

The last two paragraphs of Sir William Willcox's letter seem to me to be a quibble. The Committee (page 54 of this report), considering the tests for establishing the fact that an individual is under the influence of alcohol, place first on the list the establishing of the fact as to whether or not the person has recently consumed alcohol. The whole of the daily press read the report in the sense I indicated in my letter. But whether the test of smelling alcohol in the breath can or cannot be regarded as an essential test for alcoholic intoxication, I repeat my charge that the test is unsound and utterly unscientific.

Sir William Willcox has shown the value of a *positive* quantitative estimation of arsenic in the urine in bringing offenders against society to book. May I, in conclusion, appeal to him as Advisor to the Home Office to give the urine estimation a fair trial with all the material that is available in the Metropolitan area? I shall be very glad to pass on my apparatus for this purpose, as alas! I have no time now for further investigation along these lines.

I am, Sir, yours faithfully,

Croydon, April 26th, 1927. H. W. SOUTHGATE.

COMPENSATION FOR A DAMAGED HAND.

To the Editor of THE LANCET.

SIR,—A recent case was heard at the Shoreditch County Court arising out of an accident in which a youth lost the last joint of his right middle finger. £50 was paid into court by way of compensation, but the claimant through his mother claimed £100. Judge Cluer, in rejecting the application of the employer, remarked to the mother that "if you had lost the top of the right middle finger you would have wanted £200 and so would I." The Workmen's Compensation Act has been in force just on 20 years and it still remains without a schedule of fixed amounts for definite injuries. Assessments are still arrived at by a more or less rule of thumb. We have the schedule of the Ministry of Pensions with which a large number of medical men have become conversant, but it is of no practical use in dealing with claims under the Workmen's Compensation Act. Under this schedule the right middle finger is assessed at £40 whilst two of its joints are worth £30 and one joint £25. Loss of the right middle finger, together with either the index- or ring-finger entitles one to a life pension of 20 per cent. which at present rates means 8*s.* a week.

I am, Sir, yours faithfully,

Old Broad-street, E.C., April 25th. J. J. SCANLAN.

LOOKING BACK.

To the Editor of THE LANCET.

SIR,—I enclose a local paper; a paragraph on p. 3, col. 3, has led me to write.

My father, who died in 1888, took his L.R.C.S. in 1828 when 19 years of age, there being no restriction as to age then. I took the same qualification in 1867, just after completing my twenty-first year; so this is a period of 99 years of practice conducted by father and son.

Looking back many things strike me, noticeably the great decrease in the rural population of this district, the very small birth-rate (10·1 instead of 30), the great diminution of infectious disease treated at home, and the increase in the number of doctors. Once upon a time the nearest hospital was 17 miles distant, and there were little or no facilities in the way of nursing for the public. Practices were not sold and there were no locum tenents, and an indoor assistant was considered well off with £40 a year.

Every practitioner dressed in a surtout and a tall silk hat. He visited his patients within the town postal delivery by walking, and the country patients on the back of a horse or in a gig, or by a combination of the local railway (when it came), and walking. In my opinion a good saddle horse was the best way of conducting country work. On more than one occasion I have ridden 50 miles, returning home within eight hours. I learned cycling when 50 years of age, thinking to save money, and I have even used a motor-cycle, and now on occasions hire a car.

I am, Sir, yours faithfully,

Crieff, April 18th, 1927. JAMES GAIRDNER.

*** The *Strathearn Herald*, which our correspondent forwards, announces Dr. Gairdner's increase of salary by the Crieff Parish Council, in appreciation of his long service as medical officer of health, suitable mention of which is also made on the minutes of the council.—ED. L.

Obituary.

ANDREW STANFORD MORTON, M.B., F.R.C.S. EDIN., F.R.C.S. ENG.

Mr. A. S. Morton, who died in retirement at Clifton on April 11th, will long be remembered by the profession at large for his invention of an ophthalmoscope which is in general use at the present time and which goes by his name. But his reputation amongst those who worked with him depends rather upon his competence as a clinician and operator than on any special device or achievement.

Graduating at Edinburgh in 1874, Mr. Morton went south to University College, London, and later studied at Paris. He became a Fellow of the Royal College of Surgeons of Edinburgh in 1877, before which time he had started ophthalmological work as house surgeon to the Royal London Ophthalmic Hospital (Moorfields). His first staff appointment was to the Royal South London Ophthalmic Hospital at Southwark, but he continued to attend Moorfields as clinical assistant, and a few years after taking the F.R.C.S. Eng. in 1888 was appointed assistant surgeon there. Later he became ophthalmic surgeon to the Royal Northern Hospital. At Moorfields Morton's work and teaching was much appreciated. To the older generation of students he was known as a thoroughly sound and dexterous operator, and his classes, at which he demonstrated (on pigs' eyes) the chief ophthalmic operations, were always popular. The knowledge which he had gained under such excellent masters as Mr. George Critchett and Sir William Bowman, whom he served when house surgeon at Moorfields, was well utilised. In diseases of the eye, however, operative skill is not solely a matter of education; it depends largely on innate capacity, and with this capacity Mr. Morton was richly endowed. He was a tall, stoutly built man, but had small strong hands with beautifully tapering fingers, and the masterly way in which he wielded a Graefe's knife impressed the onlookers from all parts of the world who congregated at Moorfields. Curiously enough, though his dexterity was great and his judgment sound, he never seemed to realise the advantages of modern aseptic methods and preferred always to operate, as his predecessors had done, in his everyday coat. An ardent refractionist at the time when retinoscopy was first introduced, Mr. Morton seized the moment to publish a short book on the corrections of errors of refraction which gave a clear account of the subject and passed through several editions. He was a good draughtsman with an excellent eye for colour, and he made use of these gifts in depicting, with much patience and accuracy, diseases of the fundus of the eye as seen with the ophthalmoscope. The early volumes of the Transactions of the Ophthalmological Society were much enriched by the reproduction of these paintings, the originals of which are preserved in the museum at Moorfields Hospital.

Mr. Morton was at one time vice-president of the Ophthalmological Society of the United Kingdom, and received for professional services the rank of Chevalier of the Crown of Italy. He retired in 1920 and was 79 years of age at the time of his death.

HARRY MATTHEWS, B.CHIR. CAMB.

THE death, at the early age of 51, of Dr. Harry Matthews, of Whitehall-court, has come as a shock to a large circle of friends and patients. Since August of last year his health had been failing, but he continued his work cheerfully until about two months before his death. Born in 1875 at Sporle, Norfolk, the youngest son of the late Thomas Matthews, of Sporle, he was educated at Grantham Grammar School (the school of Isaac Newton), St. John's College, Cambridge, and St. Mary's Hospital. He graduated in Arts in 1897 and took the B.Chir. in 1900, and at Cambridge was prominent both on the football field and the river. After filling house offices at his hospital, where he was house surgeon to the late Mr. Edmund Owen, he joined the late Dr. Boyter Johnson in practice at Whitehall-court.

During the war he obtained a temporary commission early in 1917 and was attached to the 51st Field Ambulance (17th Division), then under the command of Lieut.-Colonel E. L. Gowlland, D.S.O. For some months he was on duty in the trenches and in the advanced dressings stations near Gavrelle West of Monchy. To quote the words of Colonel Gowlland: "His unfailing cheerfulness, quiet courage, and above all his kindness and sympathy with the men under him and with his patients made him a most valuable officer, and the Field Ambulance was the poorer when he was transferred to the Headquarters' Staff of the Vth Army Corps." At the Corps' Headquarters Matthews had medical charge of the personnel of the staff, and in addition attracted to himself a large clientèle among the peasants in the various villages in which the staff was billeted. With many of these humble patients he corresponded for some time after the war.

Harry Matthews was a good example of a type of general practitioner found at its best development in this country. One of his old chiefs writes of him: "He had a real clinical instinct born of years of patient and conscientious observation; he kept himself abreast of the developments of modern medicine, and possessed that instinct of service which led him to give his all ungrudgingly to those who placed their confidence in him. To Harry Matthews all class distinctions vanished where a patient was concerned." And this was exemplified by the large and varied congregation which assembled at the memorial service held to his memory in St. Martin's Church, W.C. He was buried at Newton-by-Castleacre, Norfolk.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg.-Comdr H. B. Hill to *President;* Surg. Lt.-Comdr. K. A. I. Mackenzie to *Victory;* Surg.-Lt. M. Brown to *Britannia* for R.N. Sick Quarters, Dartmouth.

ROYAL ARMY MEDICAL CORPS.

Maj. J. R. P. Allin to be Temp. Capt. and temporarily relinquishes the rank of Maj.

Capts. to be Majs.: R. B. Myles, G. W. Rose, J. T. McConkey (Prov.), and R. McKinlay.

To be Temp. Lts.: D. J. Allan and G. M. Cooper.

ARMY RESERVE OF OFFICERS.

Capt. G. T. Baker relinquishes his commn. and retains the rank of Capt.

Capt. R. M. Le H. Cooper, having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

TERRITORIAL ARMY.

Lt.-Col. T. A. Hindmarsh, from Active List, to be Lt.-Col. Supernumerary for Service with O.T.C.—Maj. H. H. Woollard resigns his commn.

ROYAL AIR FORCE.

The undermentioned Flight Lts. are promoted to the rank of Squadron Leader: T. R. S. Thompson and R. S. Topham.

INDIAN MEDICAL SERVICE.

The King has approved the retirement of Lt.-Cols. J. G. P. Murray and R. M. Carter.

Capts. Anant Yashwant Dabholkar, Ram Nath Khosla, Ratenshaw Nariman Kapadia, S. A. McSwiney, and Huggahalli Sundra Rajan to be Majs.

Capt. Srish Chandra Sarkar (permitted to retain the rank of Capt.), and Lt. Jodh Singh Guruwara relinquish their temp. commns.

Kulwant Rai to be Lt.

THE TOTAL ECLIPSE OF JUNE 29TH, 1927

PROTECTION OF THE EYES.

BY ARNOLD LAWSON, K.B.E., F.R.C.S. ENG.,
SENIOR OPHTHALMIC SURGEON, MIDDLESEX HOSPITAL;
AND
ARTHUR L. WHITEHEAD, F.R.C.S. ENG.,
CONSULTING OPHTHALMIC SURGEON, GENERAL INFIRMARY, LEEDS.

THE forthcoming eclipse of the sun brings up again the question of protecting the public from the serious risk to the eyesight which must accompany any attempt to observe the sun's disc without an efficient light filter before the eyes. On previous occasions a general warning has been issued through the press, advising the wearing of dark-tinted glasses or the use of a piece of glass smoked in a lamp or candle flame. The matter, however, has never received the attention it deserves, and, beyond formulating the desirability of protection, the detail as to tint, density, and elimination of particular portions of the spectrum has been left practically untouched.

On this account we have been giving the matter a very careful examination, the result of which is that it will now be possible for everybody to obtain at a trifling cost a screen through which the eclipse can be observed throughout all its phases without dazzling, and with perfect comfort and safety to the eyes. The question was not so easy or straightforward as might appear at first sight. For the sake of clearness it is as well to enumerate the essential points which such a screen must possess.

(*a*) In order to avoid all risk of "eclipse blindness" it is imperative to employ a screen which will cut out the powerful ultra-violet rays of the sun's beam. These rays constitute a considerable portion of the sun's radiant energy. Being invisible, they are useless for vision, and when intense, as they are in direct sunlight, they are very irritant to the eye.

(*b*) A second essential is to decrease the general luminosity sufficiently to remove the insupportable glare from the sun's orb.

(*c*) These two previous desiderata must be so arranged that the observer may be able, not only to see the outline of the sun as it varies with the progress of the eclipse, but may also be enabled to view the less conspicuous phases of the eclipse in comfort.

(*d*) The public must be made to understand that neither simple smoked glass nor fogged photographic film are safe screens even when well prepared, for in neither case are the irritant ultra-violet rays absorbed. These screens do no more than reduce the intensity of the beams.

(*e*) The screen must be put on the market at such a low cost that its purchase will come easily within the means of the working classes.

We at first turned our minds to existing kinds of glass on the market with the hope of finding what we wanted. Crookes's glass fulfilled the essential of cutting out ultra-violet radiation, but in other respects even the darkest shade obtainable was far from satisfactory. Peacock blue seemed to be much the best glass, because it is not only as efficient as Crookes's glass with regard to absorption of ultra-violet rays, but it also entirely cuts out the red end of the spectrum, and thereby imparts a peculiar sense of coolness and comfort. However, it fails again in allowing too much of the luminous radiation to come through, and further it interferes seriously with the colour scheme and would altogether mask the natural coloration of the sky and eclipsed sun. Moreover, when the essential question of cost came to be considered, both Crookes's and peacock blue glass, apart from the question of fitness for the purpose in hand, were much too expensive for production at the low cost which, as already pointed out, is absolutely essential if the mass of the general public are to be persuaded to purchase the screen.

At this juncture we approached Mr. Theodore Hamblin, of the well-known firm of opticians, 15, Wigmore-street, London, W.1, who suggested calling in the advice of Dr. Judd Lewis. These two have worked in collaboration with the result that Dr. Lewis has produced exactly what is wanted, which Mr. Hamblin is prepared to put on the market at the essential low cost. Briefly, Dr. Lewis has evolved the idea of utilising photographic film, which is first fogged by exposure to light so as to produce a certain density, and then treated by a special method, as a result of which all the spectrum of wave-length shorter than 4000 Angstrom units is cut off (see figure). By this means a medium is obtained which reduces the luminosity of the sun to a safety point and also entirely disposes of all danger from ultra-violet radiation. Simple fogging would not alter the character of the spectrum, but only reduce its intensity, which, as already pointed out, is not a sufficient safeguard if a person gazes for any length of time at the sun's orb. Further, this treatment does not alter the colour of the film so that the sky and eclipsed sun are seen in their natural colour. This prepared film has been registered under the name of "Eclipsia" and Mr. Hamblin has arranged to put it on the market in two forms. The cheaper form will be provided in the character of a mask and sold at a shilling, which will bring it within reach of every purse, and in addition there will be a rather more elaborately contrived arrangement at a slightly increased cost for those who desire it. This latter type will contain three screens of different densities—one, very dense, for viewing the sun when it is but little eclipsed; a medium density for observation when the eclipse is well advanced; and one which is nearly clear for observation when the eclipse is nearly total.

[Spectrograph by Dr. Judd Lewis. The upper figure shows the spectrum of untreated and the lower that of treated photographic film. The completeness of the cut-out of the ultra-violet radiation in the lower figure is well shown.

Our personal connexion with the matter is now at an end. We hope that we have secured the safety of the public by initiating this investigation, and we heartily congratulate Dr. Lewis on his scientific acumen and Messrs. Hamblin on the interest they have displayed and the business-like manner in which they have realised and tackled the proposition. Messrs. Hamblin have control of the manufacture of "Eclipsia" and all inquiries with regard to this matter must be addressed to the firm. We can only trust that through the medium of

THE LANCET the general public may be again cautioned and informed of the means that lies at hand of enjoying with perfect comfort and safety all the wonderful phenomena of the eclipse.

ST. THOMAS'S HOUSE.

A RESIDENTIAL CLUB FOR MEDICAL STUDENTS.

A RESIDENTIAL club for the students at St. Thomas's Hospital, adjoining the grounds of Lambeth Palace, was opened on Tuesday morning last by the Archbishop of Canterbury. The fine building of seven storeys contains over 70 bedrooms, as well as all the accommodation necessary for the social life of the students. The mantel-piece in the common-room forms the war memorial erected by past and present students of St. Thomas's to the memory of their fallen brethren and was unveiled by the Archbishop at the close of the opening ceremony.

The Archbishop, with whom was Mrs. Davidson, was received by Sir Arthur Stanley (Treasurer of the Hospital), Sir George Makins (Chairman of the War Memorial Committee), and Dr. L. B. Maxwell (the Warden of the House). The company assembled in the common-room when Sir Arthur Stanley explained the need which had been felt for some time for proper club accommodation for the students, who had surrendered their previous none too good premises which were now being used as laboratories in response to the growing demands of medical education. Not only, he said, had these premises to be replaced, but quarters could no longer be found in the Hospital for the large resident staff, and the erection of the St. Thomas's House was decided upon. The scheme became immediately possible by the generosity of Lord Riddell who lent them at once the sum of £30,000 at very low interest; a similar sum, the governors thought, was within their capacity to raise, the House costing some £60,000. Sir Arthur Stanley thought the governors and staff of the Hospital could congratulate themselves upon St. Thomas's House as a practical demonstration that their Hospital, though even its re-endowment dated from 1215, was still in the van.

Lord Riddell and Sir Cuthbert Wallace, the Dean of the medical school, spoke briefly of the value from all points of view of the possession by the Hospital of such a social centre.

The Archbishop expressed his great pleasure at being connected with the ceremony; the association was natural as for centuries before the present hospital arose on the south bank of the Thames the Archbishops of Canterbury had been located there, he thought to the benefit of their neighbours apart from anything religious or ecclesiastical.

The Lord Mayor of London thanked the Archbishop in the name of the City of London, and Sir George Newman spoke of the value of social amenities to a university medical school. The Archbishop then unveiled the memorial and received through Mr. C. A. R. Nitch a cheque for £700, money contributed by the honorary staff of the Hospital, for the furnishing of the club room.

A short service having been conducted by the Rev. R. B. Cornish, the proceedings closed with the singing of the National Anthem.

MUNICIPAL DENTAL HOSPITAL.—Mr. John Wheatley, M.P., recently opened a municipal dental hospital which has been started at Shoreditch, under the powers granted to borough councils to establish hospitals. Dental work will be done for the maternity and child welfare centre and treatment will also be given at moderate fees to persons residing or working in the borough. The staff includes an anæsthetist and a dentist who is also a registered medical practitioner. It is intended that the new institution shall give dental care to people who would not otherwise get it, and propaganda will be undertaken to impress on the inhabitants of Shoreditch the need for looking after their teeth.

Medical News.

SOCIETY OF APOTHECARIES OF LONDON.—At recent examinations the following candidates passed in the undermentioned subjects:—

Surgery.—L. G. Apps, P. Brookes, and W. H. Collins, London Hospital; A. F. J. D'Arcy, St. Mary's Hospital; W. Howard, Liverpool; S. B. S. Smith, St. Bartholomew's Hospital; and L. Wasef, Manchester.

Medicine.—D. K. Reynolds, King's College Hospital; and S. K. Rigg, Bristol.

Forensic Medicine.—J. Bramall, Leeds; C. M. Brooks, Durham; J. A. Fernandez, St. Bartholomew's Hospital; W. D. Neill, London Hospital; and D. K. Reynolds, King's College Hospital.

Midwifery.—P. Brookes, London Hospital; R. P. Charles, King's College and Charing Cross Hospital; W. Howard, Liverpool; H. S. Marks, Guy's Hospital; B. Rosenzvit, Middlesex Hospital, S. B. S. Smith, St. Bartholomew's Hospital; and M. A. Yousef, Liverpool.

The Society's diploma of licentiate was granted to Miss L. G. Apps.

UNIVERSITY OF GLASGOW.—On April 23rd the following degrees were conferred:—

M.D.

†R. L. Mackay, *D. M. Lindsay, *James Lindsay, Grace M'Lintock, and P. O. Moffat.

CH.M.

†J. R. Learmonth.

B.SC.

In Public Health.—R. L. Leask.

M.B., CH.B.

With Honours.—James Richard and W. F. Greer.

With Commendation.—F. T. Land, Albert Sharman, C. N. Robinson, Jeannie M'C. Robertson, and Hugh Black.

Ordinary Degree.—Waradea Abdurahman, Margaret K. M. Alexander, Archibald Blair, G. F. Cables, Angus Campbell, John Campbell, Margaret C. Campbell, Colomba C. Capaldi, Hugh Dickie, Joseph Downes, D. J. Ferguson, J. S. Ferguson, J. A. Fleming, H. W. O. Frew, J. P. Galloway, Thomas Gibson, Mary L. Gilchrist, Marjorie Gillespie, W. H. Graham, B. M. Hegarty, James Hepburn, James Hill, H. V. Lavelle, J. L. M'Colm, E. C. Macdonald, Isabel M. Macdonald, C. J. M'Ghee, I.S. M'Gregor, A. A. M'Millan, D. R. M'Pherson, Alexander Matchett, J. F. Milne, R. A. Neill, R. L. Paterson, Annie B. Price, J. A. Reid, J. F. Russell, F. F. Schorn, Sydney Sharman, J. S. Sharpe, J. B. Simpson, Nathan Smith, Peter Spence, A. M'D. Steel, J. R. Sutherland, Anne I. Symington, A. C. Thomson, Donella A. F. Watson, William Watson, and Edward Yoddes.

* With commendation for thesis.
† With high commendation for thesis.

UNIVERSITY OF LONDON: *London Hospital Medical College.*—The Schorstein Memorial Lecture will be delivered by Prof. Knud Faber, of the University of Copenhagen, at 4.15 P.M., on Thursday, May 19th, in the Anatomical Theatre of the College. His subject will be Gastritis, Its Relation to Achylia and Ulcer. Members of the profession are invited to attend.

UNIVERSITY OF BIRMINGHAM: *William Withering Memorial Lectureship.*—A course of ten lectures on Organic Inheritance in Man is being given by Dr. F. A. E. Crew at the Medical School, Edmund-street, Birmingham. The first two lectures were delivered on April 27th and 28th. Subsequent lectures will be given at 4 P.M. on May 4th, 5th, 12th, 19th, 25th, 26th, and June 1st and 2nd.

INDIAN MEDICAL SERVICE DINNER.—The annual dinner of the Indian Medical Service will be held at the Trocadero Restaurant on Wednesday, June 15th, at 7.15 for 7.30 P.M. Major-General R. W. S. Lyons has been invited to take the chair. Tickets and all particulars may be obtained from the joint hon. secretary, Colonel J. J. Pratt, I.M.S. (ret.), 18, Nevern Mansions, Warwick-road, London, S.W. 5.

NATIONAL ASSOCIATION FOR THE PREVENTION OF TUBERCULOSIS.—The thirteenth annual conference of this Association will be held at the House of the British Medical Association, Tavistock-square, London, W.C.1, on June 30th and July 1st and 2nd. It will be opened on Thursday, June 30th, at 10.30 A.M., by Mr. Neville Chamberlain, the Minister of Health, and the main subject of discussion will be the present lines of attack on tuberculosis and their relative value. Amongst those who will take part are Sir John Robertson, Prof. H. R. Kenwood, and Prof. Edgar L. Collis. Visits will be paid to various institutions and housing schemes. The conference will be open to all persons interested in tuberculosis on payment of the fee of one guinea.

Dr. Arthur Young has been appointed pathologist to the Institute of Medical Research, Kuala Lumpur, Federated Malay States.

ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION.—The next quarterly general meeting of this association will be held on Thursday, May 19th, at the house of the British Medical Association, Tavistock-square, London, W.C. 1, under the Presidency of Lieut.-Colonel J. R. Lord. At 3.30 P.M. Lieut.-Colonel Edwin Goodall will deliver the Eighth Maudsley Lecture, in which he will deal with Some of the Work Done to Elucidate the Pathology of Disease Falling to be Considered Under the Rubric "Insanity."

DENTAL CLINIC AT THE ROYAL FREE HOSPITAL.—Mr. George Eastman, the head of the Kodak Company, has given £300,000 for the establishment of a dental, tonsil, and adenoid clinic which is to be associated with and adjoin the Royal Free Hospital. Ten years ago Mr. Eastman provided a similar clinic, at Rochester in the State of New York, which has done such good work that he desires to establish one in Europe on the same lines and regards London as the best centre. It is hoped that the building will be completed within the next two years. Dr. H. J. Burkhart, the American dentist who is representing Mr. Eastman, states that there will probably be 50 chairs in the main infirmary and 7 in the orthodontic department. A condition of the gift is that money should be provided for maintenance and operating expenses.

ROYAL NORTHERN HOSPITAL: *Post-Graduate Instruction.*—Two separate courses are offered at this hospital. The first is open to all practitioners free of charge and its object is to present up-to-date information in such a form that it can readily be applied in practice. It consists of a weekly lecture on Tuesdays at 3.15 P.M., followed by tea, and the series held since January, which has been well attended, will go on until the end of June; a programme shows the scope and variety of the lectures. Three times a year—in February, May, and October—intensive courses are held. They last for one week, during which time the entire hospital is thrown open to practitioners, two lectures or lecture-demonstrations being given every afternoon. The next intensive course will begin on Monday, May 23rd. The other instruction given at the hospital is for the benefit of candidates for the M.D. or M.R.C.P. examinations. The course deals with recent advances in medicine, with important points in biochemistry, bacteriology, and general pathology, and with medical anatomy. It is held three times a year—the next being in the second half of June—and lasts from two to three weeks; a fee of 5 guineas is charged. Further particulars may be had on application to Dr. E. G. B. Calvert, Dean of the hospital.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—Mr. C. B. Goulden will give a demonstration at the Royal London Ophthalmic Hospital on Tuesday, May 3rd, at 1 P.M. This demonstration is free to members of the medical profession. Several special courses have been arranged for May. The staff of the All Saints' Hospital will give a series of clinical and cystoscopic demonstrations from May 2nd to 28th, and on every Wednesday during the four weeks a lecture will be delivered at 2 P.M. The Maudsley Hospital will hold between the same dates an afternoon course in psychological medicine; demonstrations on the pathology of mental diseases, clinical psychiatry, and the psychoneuroses are some of the many subjects to be dealt with. Another course, beginning on May 4th and continuing for four weeks, is that provided by the London Lock Hospital; it comprises clinical teaching in the out-patient department and a series of formal lectures dealing with the various phases of venereal disease. On successive Wednesdays from May 4th to 25th, Prof. Louise McIlroy will give lecture-demonstrations at the Royal Free Hospital on antenatal diagnosis and treatment. An intensive course will be given at the Central London Throat, Nose and Ear Hospital, from May 9th to 28th; early application is desirable as the operative course has a limited entry. From May 9th to July 15th the National Hospital, Queen-square, will hold a course on neurology, comprising clinical lectures and demonstrations, teaching in the out-patient department, and pathological demonstrations and lectures; there will also be a course in anatomy and physiology and one in methods of examination. Two other courses, beginning on May 16th, and continuing for two weeks, are those at the Infants Hospital and the Hampstead General Hospital. The former will be of special interest to those engaged in infant welfare work; the latter is primarily for the general practitioner. Copies of all syllabuses, of the general course programme, and of the *Post-Graduate Medical Journal* are obtainable from the Secretary of the Fellowship, at 1, Wimpole-street, London, W.1.

PEOPLE'S LEAGUE OF HEALTH.—The League has arranged four lectures on Sunlight and Health, to be given at the rooms of the Medical Society of London, 11, Chandos-street, Cavendish-square, W. 1, on May 12th, at 6 P.M., and at the same hour on the following Thursdays. Among the lecturers will be Dr. Leonard Hill, F.R.S., and Dr. P. C. Varrier-Jones. Tickets and further information may be had from Miss Olga Nethersole, R.R.C., at 12, Stratford-place, W. 1.

CHELSEA HOSPITAL FOR WOMEN.—The annual report states that the past year has been the first to show the working capacity of the new building. The number of in-patients rose from 775 in 1924 to 1437 in 1926. The major operations rose from 495 to 800, and the minor operations from 290 to 609. During the year 226 patients were received into the "paying floor" of 18 beds which may be looked upon as self-supporting.

MONTREAL TYPHOID EPIDEMIC.—The origin of this epidemic, which began on March 4th and has resulted in 2435 cases, with 182 deaths, has, it is believed, been traced to a man, a typhoid "carrier" of 20 years' standing, who obtained employment in a city dairy in ignorance of his condition.

THE LATE DR. CAROLINE MATTHEWS.—At the age of 49 Dr. Caroline Matthews has died at Sydenham from influenzal pneumonia. The daughter of the late Mr. John Twigge, of Liverpool, she received her medical education at the University of Edinburgh where she graduated in 1903. Both during the Messina earthquake of 1908 and the epidemic of small-pox at Cinquefrondi in Calabria in 1909 she saw service as surgeon with the Italian forces, and in 1911 she received King Victor Emanuel's commemoration medal and the Italian Red Cross Medal. During the Balkan War of 1912–13 she was attached as surgeon to the Montenegrin army, receiving the Order of Danilo; she also acted as war correspondent to the *Sphere*. On the outbreak of the late war she hurried back to the Balkans, at her own expense, to offer her services to the Serbs. The conditions were very bad and when the Serbs evacuated Uzsitsi in October, 1915, Dr. Matthews decided to remain behind in charge of the military hospital to which she was surgeon. She is said to have refused to undertake some of the medical work required of her by the Austro-German command, and she was taken to Belgrade as a prisoner of war on a charge of espionage. These experiences undermined her health. Dr. Matthews was the author of various newspaper articles besides a number of books describing her adventures.

DEPUTATION ON IRISH MEDICAL AFFAIRS.—A deputation from the Irish Medical Committee, consisting of Dr. R. J. Rowlette, Dr. A. McBride, Dr. J. B. McClancy, Dr. J. P. Shanley, Dr. M. O'Brien, Dr. T. Hennessy, and Mr. C. H. Gick recently waited on the Department of Local Government and Public Health in connexion with the following matters: (1) transfer of medical officers under the Local Authorities (Officers and Employees) Act, 1926; (2) private patients in county and district hospitals; (3) remuneration of Registrars of Births, Deaths and Marriages. The deputation was received on behalf of the Minister by Mr. E. P. McCarron, secretary, and Dr. E. F. Stephenson, chief medical adviser to the department. With regard to the transfer of medical officers, the deputation urged that the Minister should refuse to sanction any transfer made as promotion unless the officer transferred was entitled to promotion on the grounds of merit or long service in accordance with the intention of Section 5 of the Act. Mr. McCarron and Dr. Stephenson agreed that the section quoted had for its object the promotion of existing officers on the lines stated by the deputation and undertook to convey its views to the Minister. With regard to the admission of private patients to county hospitals, the deputation stated that whilst it was satisfied with the draft regulations forwarded by the department to the county health boards for adoption, these bodies did not show any desire to put them in force, and thus enable the doctors attached to the hospitals to arrange with private patients for payment for their medical attendance. The deputation was informed that the department would use its influence, in the first instance, to have the draft regulations adopted by the health boards, and in the event of their refusal it would consider further representations from the profession. In connexion with the increased remuneration for registrars, the deputation was invited to prepare a memorandum stating the position of these officials. Mr. McCarron and Dr. Stephenson agreed that the fees paid at present for this work were inadequate. More than 90 per cent. of the registrars in Ireland are dispensary doctors and the registration areas correspond to their dispensary districts.

DROITWICH SPA BRINE BATHS.—At 3.30 P.M. to-day, April 29th, Mr. Neville Chamberlain, Minister of Health, is to open extensions to the St. Andrew's Brine Baths at Droitwich.

MEDICAL GOLFING SOCIETY.—The final of the Knock-out Tournament was won by Mr. J. Cunning, the runner-up being Dr. E. Playfair.

GIFT TO BIRMINGHAM HOSPITALS.—Mr. W. R. Morris, the motor-car manufacturer, who recently gave £104,000 to St. Thomas's Hospital, has made a gift to the Lord Mayor of £25,000 for the Birmingham hospitals.

VICTORIA PARK HOSPITAL, LONDON.—It was stated at the annual meeting last week of the City of London Hospital for Diseases of the Heart and Lungs, Victoria Park, that, owing to repeated deficits, the Saunderton Sanatorium has been closed. The Research Institute given by the Prudential Assurance Company is approaching completion and will be opened formally in a few weeks' time. It is hoped to raise a fund of £25,000 to enable the hospital to be enlarged and the sanatorium reopened.

MR. SPAHLINGER AND THE WELSH NATIONAL MEMORIAL.—In a report presented to the Council of the Welsh National Memorial Association at its quarterly meeting in Chester on April 22nd, the Medical Committee states: "The application of public or other funds towards the Spahlinger Institute cannot be recommended by this committee. The publicity campaign on behalf of the Spahlinger movement is to be deprecated as unjustified by the evidence so far adduced, and to be deplored as raising false hopes in the minds of sufferers from tuberculosis." The report is to be considered further at a special meeting of the Council, to be held at Shrewsbury in May.

ANALYSIS OF WHOLE-FRUIT JAM.—At Salford Police-court on April 6th a manufacturing company was fined £20 and costs for selling to the city food inspector a pot of jam which was not of the quality and substance demanded. The jam was advertised as being made from "freshly gathered whole fruit, ripe and perfect." Analysis showed that the sample contained cane-sugar, 26 parts; invert sugar, 32; glucose syrup and unfermentable matter, 6; insoluble solids and ash, 2; and water, 34. The jam was coloured with an aniline dye, and contained 20 parts per million of sulphur dioxide. There was practically no whole fruit in it. The sample had been made from fruit pulp preserved with sulphur dioxide. A plea of guilty was entered, and it was stated that the advertising agents of the firm had made a mistake.

AN EGYPTIAN CONGRESS: DISCUSSION OF TROPICAL DISEASES.—A medical Congress for the discussion in particular of tropical diseases will take place in Cairo from Dec. 15th to 24th. The Committee of Honour includes the names of Profs. J. L. Faure and A. Loutfi el Sayed as Presidents, and Dr. Andrew Balfour, Prof. J. W. W. Stephens, Dr. Aldo Castellani, and Dr. J. G. Thomson. The Congress is being organised by the *Revue Pratique des Maladies des Pays Chauds*, and the Secretary-General is Dr. Zeitoun (32, rue Gay Lussac, Paris). There will be committees for publication and propaganda purposes. The scientific committee consists of Professors and Doctors Strong, R. H. Elliot, Aldo and Edward Perroncito Madsen, Warrington, Brumpt, Heckenroth Reynaud, Gilbert Sicard, Tuffier, Duval, Guiart, Besançon, Marchoux, Mandoul, Joyeux, Neveu, Lemaire, Nobécourt, Léon Bernard, Bertin-Sans, Jeannin, Victor Pauchet, Rieux, Radais, Audibert, Sorrel, Nattan-Larrier, Sartory, Vuillemin, Tanon, Brulé, Garin, Gaujoux, Leenhardt, Gougerot, Dalché, Morax, F. Ramond, Ravaut, Rist, Sanarelli, and Tépine.

The work of the Congress will be to receive communications and to organise conferences upon diseases generally, and especially upon tropical diseases, such as abscess of the liver, bilharziasis, oriental sore, leprosy, trypanosomiasis, kala-azar, trachoma, malaria, yellow fever, and undulant fever, general hygiene being considered. The sections range over the whole of medicine and surgery and pathology, especially tropical, classified under bacteriology, urology, gastro-enterology, pharmacy, parasitology, dermatology, oto-rhino-laryngology, pediatrics, tuberculosis, hygiene, and veterinary medicine. The titles of communications and their résumés must be sent to Dr. Zeitoun before Oct. 1st. The time allowed for each of the communications will be 10 minutes and 20 minutes for the conferences.

There will be an international Exhibition of Arts and Sciences, as applied to medicine, surgery, pharmacy, and sanitary administration. A detailed programme with the conditions of membership can be obtained on request from the Organising Committee, and those joining the Congress will be granted facilities of travel and reduction of fares by the steamship companies on production of their cards of membership.

Parliamentary Intelligence.

HOUSE OF COMMONS.

TUESDAY, APRIL 26TH.

THE House of Commons reassembled on this date after the Easter recess.

Chemical Substances in Flour.

Mr. DAY asked the Minister of Health whether, in view of the report of the departmental committee on the treatment of flour with chemical substances, he was considering the introduction of legislation to enforce a recommendation that flour should be in the product of the milling of wheat without the addition of any foreign substances; and, in view of the menace to the health of the nation, would he consider incorporating in any legislation introduced a clause that would in future prohibit the making or kneading of bread by hand by the introduction and installation of mechanical mixers.—Mr. CHAMBERLAIN replied: No, Sir, I am not proposing, at present, to introduce legislation of the nature suggested.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY, May 3rd.—5.30 P.M., ORTHOPÆDICS. Annual General Meeting: Election of Officers and Council. Paper: Mr. Norman D. Royle (Sydney University): The Treatment of Spastic Paralysis by Sympathetic Ramisection (illustrated by "Kodascope" projector).

WEDNESDAY.—5.30 P.M., TROPICAL DISEASES AND PARASITOLOGY. Annual General Meeting: Election of Officers and Council. Paper: Dr. P. Y. Lampe: *Schistosoma mansoni* in Surinam (communicated by Dr. J. B. Christopherson).

FRIDAY.—5 P.M., LARYNGOLOGY. (Cases at 4 P.M.) Annual General Meeting: Election of Officers and Council. Paper and Demonstration: Dr. W. Jobson Horne: An Epidiascopic Demonstration of Chronic Hypertrophic Laryngitis with Some Observations on Treatment. Cases and specimens will be shown by Mr. A. R. Tweedie and others. 8.30 P.M., ANÆSTHETICS. Annual General Meeting: Election of Officers and Council.

SATURDAY.—OTOLOGY. The Annual General Meeting will be held at 1, Wimpole-street, W., at 9.15 A.M., when the election of Officers and Council will take place. Immediately after, Members will proceed to the North-Eastern Fever Hospital, St. Anne's-road, Tottenham. Transport is being arranged to and from the Hospital in time to be back at the Society's house by 12.30 P.M. Demonstrations of radiography of the mastoid in children, treatment by artificial sunlight, &c., will be given.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.

TUESDAY, May 3rd.—5 P.M., Dr. C. Gordon Douglas: The Coördination of the Respiration and Circulation with Variations in Bodily Activity. (First Oliver-Sharpey Lecture.)

THURSDAY.—5 P.M. (Second Oliver-Sharpey Lecture.)

UNIVERSITY COLLEGE, Gower-street, W.

TUESDAY, May 3rd, and following Wednesday and Friday.—4.30 P.M., Prof. J. S. B. Stopford: Sensation and the Sensory Pathway (admission free).

KING'S COLLEGE, Strand, W.C.

TUESDAY, May 3rd.—5 P.M., Prof. R. J. S. McDowall: Autonomic Nervous System. (First of four free lectures.)

INSTITUTE OF PATHOLOGY AND RESEARCH, St. Mary's Hospital, W.

THURSDAY, May 5th.—5 P.M., Prof. C. Prausnitz (Institute of Hygiene, Breslau): Experimental Researches on the Nature of the Bacteriophage.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, May 2nd, to SATURDAY, May 7th.—FELLOWSHIP OF MEDICINE. Mr. Goulden will give a demonstration on Tues., at the Royal London Ophthalmic Hospital at 1 P.M. Free to members of the medical profession.—ROYAL FREE HOSPITAL, Gray's Inn-road, W.C. Wednesday, 5 P.M., Demonstration by Prof. McIlroy. 5.15 P.M., Dr. C. B. Heald: lecture-demonstration.—ROYAL WATERLOO HOSPITAL, Waterloo-road, S.E. Comprehensive course in Medicine,

Surgery and Gynæcology.—LONDON SCHOOL OF TROPICAL MEDICINE, Endsleigh-gardens, N.W. Tuesday, Dr. Manson-Bahr: Thursday, Dr. Low. Lecture-demonstrations.—MAUDSLEY HOSPITAL, Denmark Hill, S.E. Afternoons only. Special course in Psychological Medicine.—LONDON LOCK HOSPITAL, Dean-street, W. Comprehensive course. Clinical teaching in Out-patient Department and formal lectures.—ALL SAINTS' HOSPITAL, Vauxhall Bridge-road, S.W. Afternoons and evenings. Demonstrations, including cystoscopies and lectures.

Further information from the Secretary.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY, May 2nd.—2 P.M., Medical Cases in the Wards. 2.30 P.M. to 5 P.M., Medical, Surgical, and Gynæcological Clinics. Operations.

TUESDAY.—2.30 P.M. to 5 P.M., Medical, Surgical, Throat, Nose, and Ear Clinics. Operations.

WEDNESDAY.—2.30 P.M. to 5 P.M., Medical, Skin, and Eye Clinics. Operations.

THURSDAY.—11.30 A.M., Dental Clinic. 2.30 P.M. to 5 P.M., Medical, Surgical, and Ear, Nose and Throat Clinics. Operations.

FRIDAY.—10.30 A.M., Throat, Nose, and Ear Clinics. 2.30 P.M. to 5 P.M., Surgical, Medical, and Children's Diseases Clinics. Operations.

ROYAL NORTHERN HOSPITAL, Holloway-road, N.

TUESDAY, May 3rd.—3.15 P.M., Dr. J. W. McNee: Pathology and Treatment of Chronic Non-suppurative Arthritis.

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.

TUESDAY, May 3rd.—5 P.M., Dr. J. A. Drake: Pyogenic Infections of the Skin.

THURSDAY.—5 P.M., Dr. H. G. Adamson: Acne Vulgaris.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE COURSE.

TUESDAY, May 3rd.—4.15 P.M., Mr. W. R. Douglas: Hæmorrhoids.

FRIDAY.—4.15 P.M., Dr. E. B. Leech: Demonstration of Medical Cases.

CHADWICK PUBLIC LECTURES.

TUESDAY, May 3rd.—5.15 P.M. (at the Medical Society of London, 11, Chandos-street, W.), Sir Thomas Legge: The Teaching of Industrial Medicine.

Appointments.

IDRIS, T. H. W., L.M.S.S.A., has been appointed Certifying Surgeon under the Factory and Workshop Acts for the Porlock District of the County of Somerset.

IRONSIDE, REDVERS, M.B., Ch.B. Aberd., M.R.C.P. Lond., Assistant Physician to the Hospital of SS. John and Elizabeth, St. John's Wood.

JONES, DILYS M., M.B., B.Ch. Wales, Woman Medical Officer to the Welsh Board of Health.

MCLAY, K., M.D. St. And., Medical Referee under the Workmen's Compensation Act for Selkirk County.

WILLIAMS, R. LESTER, M.B., B.Ch. Camb., F.R.C.S. Eng., Surgical Registrar at the London Lock Hospital, Dean-street.

Vacancies.

For further information refer to the advertisement columns.

Bolton, County Borough Education Committee.—Asst. M.O.H., &c. £600.

Burton-on-Trent.—Asst. M.O.H. £600.

Canterbury Dispensary, 60, Burgate-street.—Res. M.O. £100.

Cardiff City Mental Hospital, Whitchurch.—Res. Clin. Asst. £52 10s. for 6 mos.

Carshalton, Surrey, Queen Mary's Hospital for Children.—Senior Asst. M.O. £650.

Central London Throat, Nose and Ear Hospital, Gray's Inn-road, W.C.—Hon. Asst. Out-patient Registrar. Also Res. H.S. £75.

Charing Cross Hospital, W.C.—P. to Children's Dept. Also Obstet. Reg.

Colchester, Essex County Hospital.—H.S. £150–£200.

Croydon County Borough.—Asst. M.O.H., &c. £600.

Croydon General Hospital.—Hon. Jun. S.

Elizabeth Garrett Anderson Hospital, Euston-road.—H.P., Obstet. Asst., and Two H.S.'s. Each at rate of £50.

Evelina Hospital, Southwark, S.E.—Temp. Asst. Aural S.

Freemason's Hospital and Nursing Home, 237, Fulham-road, Chelsea, S.W.—Res. M.O. At rate of £250.

Golden-square Throat, Nose, and Ear Hospital, Piccadilly Circus, W.—H.S. £100.

Herefordshire General Hospital, Hereford.—Res. H.P. £100.

Leeds, St. James' Hospital.—H.P.'s and H.S.'s. Each £200.

Newark Hospital.—Res. H.S. £200.

North Middlesex Hospital, Edmonton, N.—Res. M.O. £200.

Norwich, Norfolk and Norwich Hospital.—Ophth. Surgs., Lecturer on Pharmacology and Therapeutics. Also H.S. £120.

Paddington Board of Guardians.—Outdoor Medical Services. Asst. M.O. £330.

Royal Free Hospital, Gray's Inn-road, W.C.—Res. Anæsthetist. Also Hon. Asst. Radiologist.

Ryde, Royal Isle of Wight County Hospital.—Anæsthetist. £100.

Salford Royal Hospital.—Med. Reg. £200.

Sheffield Royal Hospital.—Res. Anæsthetist.

Stamford, Rutland and General Infirmary.—H.S. £150.

Stirling District Mental Hospital, Larbert.—Second Asst. M.O. £275.

Stoke-on-Trent, North Staffordshire Royal Infirmary.—H.P. £150.

Sudan Government.—Laboratory Asst. £324.

Sudan Government, Wellcome Tropical Research Laboratories, Khartoum.—Asst. Bacteriologist. £720.

West Bromwich and District Hospital.—Hon. Phys.

West London Hospital, Hammersmith-road, W.—Hon. Med. Radiologist. Also Asst. P.

Western Ophthalmic Hospital, Marylebone-road, N.W.—Hon. Asst. S.

Westminster Hospital, Broad Sanctuary, S.W.—Fourth Asst. Phys.

Wolverhampton and Staffordshire Hospital.—H.S. At rate of £150.

Woolwich and District War Memorial Hospital, Shooters Hill.—Hon. S.'s., P.'s, Radiologist and Anæsthetist.

Births, Marriages, and Deaths.

BIRTHS.

ADAMS.—On April 23rd, at Lynedoch-crescent, Glasgow, W., the wife of Douglas K. Adams, M.D., of a son.

CAMPBELL.—On April 19th, at Lexham-gardens, London, W. the wife of Dr. J. M. H. Campbell, of a daughter.

CROWTHER.—On Tuesday, the 26th April, at Bleak House, Penistone, to Florence Evelyn, the wife of Dr. H. A. Crowther—a daughter.

HITCHINGS.—On April 14th, at Westfield, Hawkhurst, Kent, the wife of Dr. D. B. Hitchings, of a son and daughter.

LOVELESS.—On April 11th, at Queen's-road, Ramsgate, the wife of Dr. W. B. Loveless, of a daughter.

ORAM.—On April 21st, at Lee-terrace, Blackheath, S.E., the wife of E. H. B. Oram, M.B., F.R.C.S., of a son.

MARRIAGES.

ANDERSON—GLAISTER.—On April 22nd, at Cathedral-square, U.F. Church, Glasgow, Frank E. Anderson, M.B., Ch.B., to Helen Douglas, only daughter of Dr. and Mrs. J. N. Glaister, Grafton-place, Glasgow.

CLAUSEN—LENNANE.—On Thursday, April 21st, Raymond John Clausen, M.B., B.S., to Elsie Edith Lennane, L.D.S.

HERMAN—FRANKS.—On April 20th, at the Parish Church, Tonbridge, Ashley Ernest Herman, O.B.E., F.R.C.S. Edin., to Noreen Joan, youngest daughter of Mr. and Mrs. Frank W. Franks, Loampits, Tonbridge.

LLOYD-WILLIAMS—DE LYONS-PIKE.—On April 23rd, at St. John's Church, Burgess Hill, Major Iorwerth Hubert Lloyd-Williams, M.C., M.B., R.A.M.C. (T)., to Gwladys, only daughter of Charles William and Lucy de Lyons-Pike, of Burgess Hill.

LOCKYER—MORTON.—On April 26th, 1927, at St. George's, Hanover-square, by the Rev. Canon Horsefield, D.D., and the Rev. Minos Devine, D.D., Cuthbert Lockyer, M.D., F.R.C.P., F.R.C.S., of Harley-street, W.1, to Violet Gwendoline Morton, second daughter of the late Dr. Augustus Charles Morton and Mrs. Morton, late of Aylsham, Norfolk.

WESTON—MORGAN.—On April 20th, at St. Germain's Church, Edgbaston, Bernard Archibald Astley Weston, M.B., Ch.B., D.P.H., to Margaret Morgan, only child of the late Lieut. Patrick Morgan, R.N., and the late Mrs. Morgan, of Southport.

DEATHS.

ROBINSON.—On April 17th, at Guy's Hospital, John Robinson, M.B., Ch.B. Edin., Medical Officer, Dispensary, Canterbury.

WATTS.—On April 21st, at "The Ferns," The Burroughs, Hendon, George William Watts, L.D.S. Eng. F.R.M.S., aged 67.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

QUEEN CHARLOTTE'S MATERNITY HOSPITAL.—The annual report for 1926 points the moral of antenatal care and treatment. Of the 194 emergency patients 9 died, while in the 1719 booked cases only three mothers died. Among the 1588 patients attended in their own homes there was only one maternal death. There were 5000 antenatal patients. The consequences of the longer period of training for midwives are stated to have been serious, the applications for training falling off so considerably that the income of the school was reduced by about £1500; moreover, additional paid nurses have had to be employed. Of late there has been some improvement, and the committee of management hope that "the dislocation caused by the drastic alteration in the rules of the Central Midwives Board will gradually disappear." An appeal is to be made for a quarter of a million for an extension which will provide 70 more beds, and for some endowment and research facilities.

Notes, Comments, and Abstracts.

NUMERICAL RELATION OF THE SEXES IN MAN.

AT a meeting of the Edinburgh Obstetrical Society on March 9th a paper on the Human Sex-Ratio was read by Dr. F. A. E. Crew, director of the Animal Breeding Research Department and lecturer in genetics in the University of Edinburgh.

It is established, he said, that the sex of an individual is determined at the time of conception by the working of a mechanism which is revealed in the differences in chromosome content of the gametes. The female elaborates only one kind of ovum, but the male elaborates two kinds of sperm in respect of the elements of the sex-determining mechanism. There is a male-producing sperm which, fertilising any ovum, yields a male, and a female-producing, which gives rise to a female. This being so, it follows that at all times after conception there is a sex-ratio. If the two forms of sperm are produced in equal numbers, if each kind is equally viable and functional, and if male and female zygotes are equally viable, then the secondary sex-ratio which obtains at birth should be equality, as was also the primary sex-ratio at conception. If the secondary sex-ratio is not equality, then the primary sex-ratio was not equality or else there must have been a sexually selective mortality operating prenatally. If the primary sex-ratio was not equality then either the two forms of sperm were not produced in equal numbers or else they were not equally functional.

Selective Mortality.

In point of fact the secondary sex-ratio is not equality, though not far removed therefrom. It would seem therefore that the primary sex-ratio is also equality and that there is no considerable sexually selective prenatal mortality. But there are certain observations which refute this conclusion. It was found that the sex-ratio of the population considered by age-groups shows a continuous swing from 55·2 males : 100 females in the "85 years and over" group to 101·5 males : 100 females in the group at the end of the second year of life, whilst the sex-ratio among individuals 1 year old is 102 : 100 and that among the newly-born 104 : 100. There is a definite selective elimination of the males throughout, save during those age-groups when reproductive stresses (menstruation, menopause) bear so heavily upon the female.

If the amount and sex-incidence of mortality during the first year of life are examined it is found that the sex-ratio of deaths during the first three months is 131·5 males : 100 females; during the second three months, 121 : 100; during the third, 120 : 100; and during the fourth 113 : 100. More boys than girls die during the first year of life and during this period the excess of male deaths over female steadily decreases as the end of the year is approached. Again there is a sexually selective mortality at work. It is seen that postnatally the sex-ratio is not static but shows a swing from nearly equality at birth to very low in senility. It becomes necessary, therefore, to inquire whether or not this swing is entirely postnatal, whether or not it is but a continuation of a process that has been operating natally and prenatally. An examination of the amount and sex-incidence of stillbirths and of abortions will throw light on this question.

The sex-ratio of stillbirths is about 133 males : 100 females, which is higher than that of live births. In the case of abortions it is impossible to deal with complete records. Embryonic deaths during the earliest months of pregnancy will not result in recognisable abortion and must remain unrecorded. The amount of abortion is about 20 per cent. of all conceptions. Moreover, this prenatal death affects the sexes differentially and the sex-ratio of abortuses becomes higher and higher as conception is approached. It would seem indeed that the primary sex-ratio must be somewhere about 170 males : 100 females. If this is so, then the primary sex-ratio is profoundly different from the secondary and the latter is equality, because throughout prenatal life there is a selective elimination of the males. Far more males than females are conceived and far more males than females perish during the period conception-parturition. Of course it may be that the primary sex-ratio is equality and that those agencies which lead to fœtal death bear more heavily upon the females during the first two months or so of pregnancy and thereafter more heavily upon the males. But there is no evidence that this is so.

The high primary sex-ratio may be the result of a differential production of the two kinds of sperm. It might be that it is physiologically more expensive for an individual to elaborate female-determining sperm than male-determining. On the other hand, it is possible that the two kinds being produced in equal numbers exhibit different powers of fertilisation. There may be differences in mortality, a differential susceptibility to adverse conditions within the female passage, a difference in the power to penetrate the egg, or a difference in the response to the attraction of the egg. Whatever may be the cause, it can be assumed that the male-determining sperm is a more efficient fertilising agent than is the female-determining. Of the differences between male and female which lead to a sexually selective elimination of one sex nothing is known. All that can be said is that the male zygote is so constituted that it cannot withstand the stresses of the act of living as well as can the female.

Racial Needs of Modern Man.

Certain suggestions of interest emerge from the study of the human sex-ratio. It will be granted that one result of advance in our knowledge of the physiology of development and of the infant will lead to the salving of the male. Antenatal clinics and child welfare centres will tend to modify the sex-ratio and so emphasise what already may be looked upon as one of the many disharmonies exhibited by the human. From the point of view of the sex-physiologist a sex-ratio of equality during the reproductive years is so unnecessary as to be almost absurd. Such a ratio is necessary only in those forms of life in which the female elaborates as many eggs as her mate does sperm, assuming that it is a criterion of biological fitness that a species should exhibit a maximum fertility-rate. In the case of the human, whilst the female now exhibits a restricted sexual life, a prolonged gestation, a reduced fecundity, the sexual attributes of the human male are the same as those of males of species in which both sexes are equally fecund.

This habit of producing a secondary sex-ratio of equality has no relation to the racial needs of modern man. It must be regarded as a physiological legacy, being the expression of a mechanism which served its primitive possessors well, but which has not become modified as mankind, evolving, shaped and re-shaped its social organisation. One male in this matter is the equivalent of very many females, and a low sex-ratio together with polygyny would seem to be all that is required for the propagation of the species. But, of course, it is not the only aim of mankind.

A GUIDE TO GHENT.

Mrs. Sydney Stephenson dedicates to the memory of her husband a small and handy guide to the City of Ghent (London: George Pulman and Sons, Ltd. Pp. 78. 1*s.* 6*d.*), issued in time to be useful to those who attend the annual conference of the Royal Institute of Public Health to be held there from June 1st to 6th next. After an interesting historical preface Mrs. Stephenson takes the visitor round the city, giving the history of each building in turn, and pointing out carefully the places from which extensive views can be obtained. A map is included and enough information to enable the visitor to get about with ease.

YEAR BOOK OF UNIVERSITIES OF THE EMPIRE.

THE Year Book of the Universities of the Empire for 1927 has just been issued by Messrs. G. Bell and Sons (pp. 858, 7*s.* 6*d.*). First published in 1914, it is edited by Walter H. Dawson for the Universities Bureau of the British Empire, 50, Russell-square, W.C. 1. From it we learn that there are now 71 British universities, their total calendars occupying some 50,000 pages, and in the year book the attempt is made to extract from each of these documents—some exceedingly bulky—information likely to prove of interest to universities and colleges, to Government departments, clubs, schoolmasters, and to the public generally. For the various sections dealing with Great Britain and Ireland, Canada, Australia, South Africa, and India introductory chapters give such information regarding the history, regulations, and practice as pertains to all the universities, while each heading comprises a directory of the office and members of the staff of the universities with their degrees; the general information includes useful facts concerning libraries, museums, and laboratories, as well as general arrangements and statistics. A group of valuable appendices deal with the regulations for obtaining the diplomas of the professional colleges, and other faculties and associations having power to grant degrees and diplomas, explain the conditions governing admission to various professions and careers—matriculation and entrance examinations, define the admission of students from abroad to universities of the United Kingdom, and supply lists of inter-university scholarships and Fellowships, of grants for research, and of constituent and ancillary schools. Thus we can learn the distribution of subjects in which the universities severally may be said to specialise, lists of centres of research outside the universities being added. A new appendix provides lists of titles of theses accepted for research degrees; this is not as full as the compilers had wished to make it, but the intention expressed to perfect the list in the next issue of the year book is welcome, for we can understand that such a category would be of real service.

DISEASE IN THE COTTON INDUSTRY.

A CONFERENCE has recently been held in London between officials in the Home Office, representatives of leading cotton employers' associations, and the Card and Blowing Room Amalgamation, which is a trade-union body chiefly concerned with cotton spinning in the preparatory stages. The object was to discuss the evils of dust in the cardrooms and ascertain if an agreement could be reached regarding preventive regulations which could be included in the next Factories Bill. The most interesting feature of the conference was the presentation of a report by the insurance section of the trade union containing a classification of the different illnesses from which cotton workers in this particular part of the industry suffer.

The table giving the "nature of illnesses causing absence from work" deals with the years 1923–24 and 1926 for men, and 1923–24 for women. The returns collated from the society's records are as follows:—

—	Men.			Women.	
	1923	1924	1926	1923	1924
Total membership ..	6883	6971	7058	25,409	25,366
Sickness per thousand ..	11·21	17·45	20·9	15·36	18·35
Accident—injury ..	47	100	80	164	219
Accident—septic poisoning	11	15	90	75	85
Anæmia	3	7	7	286	322
Apoplexy	3	3	—	—	2
Appendicitis and peritonitis	5	13	18	32	47
Bladder disease	3	2	4	22	38
Bronchitis	160	247	409	391	489
Cancer	1	1	8	3	4
Diabetes	1	2	—	2	2
Ears and hearing ..	4	10	3	12	17
Epilepsy	—	5	—	5	10
Eyes and eyelids	14	8	11	36	59
Hæmorrhoids	4	9	10	14	9
Heart and blood-vessels ..	38	42	57	100	157
Hernia	7	6	14	14	11
Infectious diseases ..	9	6	—	28	28
Influenza and colds ..	132	240	214	932	1053
Kidneys	8	14	15	19	26
Liver	—	5	1	1	3
Neurasthenia, neuritis, neuralgia, hysteria ..	15	40	34	128	184
Nervous system (other than above)	15	12	25	26	71
Nose	3	4	9	1	23
Phthisis	9	11	26	29	40
Pneumonia and pleurisy ..	32	34	18	56	79
Rheumatic affections ..	61	99	133	304	330
Sexual organs	2	9	9	227	229
Skin (including ulcerations)	41	62	22	126	180
Stomach and bowels) ..	64	95	133	430	418
Tonsillitis and quinsy ..	34	37	49	290	327
Tubercular disease of joints, glands, skin, meninges, &c.	—	4	11	20	29
Other illnesses	46	75	67	130	165
Totals	772	1217	1477	3903	4656

Another table dealing with disablement benefit states that during 1926, 256 persons were in receipt of this particular benefit. Of this number, the following were certified to be suffering from—

Bronchitis	88 cases	343 per thousand
	6 deaths	68 claims.
Average age at date of claim ..		55 years 7 months.
Average period of claim		1 year 9 months.
Phthisis and tuberculosis	20 cases ..	78 per thousand
	3 deaths ..	150 claims.
Average age at date of claim ..		38 years.
Average period of claim		2 years 8 months.

These data display the women as experiencing more sickness than the men—which is usual for women between ages 15 and 45 as compared with men of similar age. The age-distribution of the two sexes, however, is not given, but the men would nearly certainly be the older group. They appear, during the comparable years 1923 and 1924, to have suffered more than the women from bronchitis and phthisis, two diseases possibly attributable to greater exposure to dust; but less from anæmia, influenza, and colds. In the absence of a table for comparison, stating the nature of illnesses experienced by a standard population, more definite deductions cannot be hazarded. To-day no such table exists for this country, while the data stated above are not presented in such a way as to permit comparison with the studies* made in America of sickness among industrial employees. The whole subject of invalidity statistics is one of great importance, and it is already, we understand, engaging the attention of the Medical Research Council.

* Vide Public Health Reports, U.S. America, January, 1926, xli., 113–131.

THE "PATRIS" SAFETY POURER.

IT is difficult to pour out the contents of a vacuum flask in a steady stream, while droplets of the liquid often find their way inside the metal case, with a consequent rusting of the metal and rotting of the packing. In order to overcome these disadvantages the "Patris" Company, 11, Thornfield-road, Bishop's Stortford, has placed on the market a device which, as is shown in the illustration, takes the form of a double-lipped glass funnel fitted to the mouth of the flask by means of a cork collar. This allows the liquid to flow in a steady stream; splashing is entirely prevented. The neck of the funnel is closed by an ordinary cork stopper. The device will be appreciated by the user of the vacuum flask for ordinary purposes and particularly by the sick-room attendant, who may have to supply an invalid with a warm liquid at intervals.

THE BEARDLESS SURGEON.

Dr. Herbert Smith (Ealing), writing in reference to the issue of THE LANCET which contained the report of the celebration of the Lister Centenary, refers to an episode which was chronicled in the *Westminster Gazette* last week, and suggests that the occurrence inaugurated "a beardless vogue" among surgeons. "When I was house surgeon at —— hospital in 1881," the quotation runs, "my colleague's whiskers were burnt off by the flaming-up of the 'Listerian Kettle' and, things being righted, a nurse remarked, 'Let us spray.'" The occurrence may not have been unusual, while the question of disinfection of flowing hair formed a further invitation to the razor.

TREATMENT OF ALOPECIA AND MENINGITIS.

To the Editor of THE LANCET.

SIR,—Kindly permit me to add to my notes on the use of iodine in cases of bursitis and adenitis (THE LANCET, April 2nd, p. 741) a more definite description of the treatment of the aborting of abscesses.

The most scrupulous cleansing of the surface of skin attacked, and then the use of a soft ointment of hydrarg. perchloridi, 1 in 1000, liberally spread on lint cut to the size of the presenting abscess. This should be repeated daily; in extensive abscesses, or even in those pouring out pus, I have never required more than a third dressing.

Now I wish to give my treatment of meningitis. This is what Sir Gilbert Barling consented to being used in my own case and with which he expressed his great pleasure. (1) In alopecia first wash well the scalp and allow to dry thoroughly. Then with a 2-inch square of soft sponge apply the following:—

℞ Antim. potass. tart. .. .. ℈ss
Sp. vin. rect. .. .. ℥ss
Aq. destillat. ad .. .. .. ℥iv

When the scalp is still moist massage with the tips of the fingers for a few minutes. In the case of females the hair should not be "put up" till completely dry, as an accumulation of the fluid in any one place would be followed by blistering, and this will not otherwise happen. It should not be used more than twice a week. This has given my scalp—quite bald at 75—a fairly presentable crop over nearly the whole surface. (2) In meningitis I have found splendid result by using the same salt, in the following prescription:—

℞ Ant. potass. tart. .. .. gr. i.
Syr. cinnam. .. .. .. ℥ss
Aq. font. ad .. .. .. ℥i

For a child of 1 month ℥i. 4ta quaque hora, and if vomiting ensues reduce the number of doses. It is well to use iced water to the head, and, if convulsions follow, to put an ice-bag along the spine from the neck to the sacrum, on for 20 minutes and off for ten. I have found this give splendid results in adult cases of convulsions which defied all other treatment. I meant to have concluded with three cases, and see I have gone one more.

I am, Sir, yours faithfully,
Clevedon, Somerset, April 19th, 1927. E. T. BURTON.

OPHTHALMIC HOSPITAL IN JERUSALEM.

THE report for 1926 of the Ophthalmic Hospital, founded in Jerusalem by the Order of St. John, shows continued progress. The number of new patients seen was 18,127. The number admitted to hospital was 1499 and the number of operations 4234. Of the new cases 7·6 per cent. were blind in one eye, 2·5 in both—"blindness" being defined as inability to count fingers at one metre. Of the blindness 70 per cent. could be traced directly or indirectly to acute conjunctivitis. The majority of the operations—about four-fifths—were performed for trachoma and its sequels. In 1924 a scheme of ophthalmic clinics at six selected centres in Palestine was begun, staffed by specially trained doctors and nurses. The work accomplished by these clinics shows an increase of 50 per cent. over that of 1925. This is a good record, but the report emphasises the need for this branch of the work to be placed on a permanent footing.

A WARNING.

WE are informed that a man who may give the name of Dr. Winter has been calling on professional men, particularly doctors and accountants, soliciting help and obtaining either money or clothing. He may describe himself as an accountant and may say that he is an old Rugby and Oxford man; he has acquired a certain amount of information about these two places to be plausible. He suffers from pulmonary tuberculosis and will quite likely state that he has been at Yardley-road, Lenham, or Papworth Sanatorium, the latter statements being true. He has lately been "working" the Oxford–Slough area. He is about 33, height 5 ft. 5 in., of spare build, with bushy eyebrows, and rather penetrating downcast eyes which do not look one in the face. Recently he was dressed in a dark grey suit and trilby hat. Doctors are advised to take necessary precautions should he call on them.

ANNUAL CHARITIES REGISTER.

THE importance of London charities in our national life is manifest from the figures contained in the Annual Charities Register and Digest[1] for 1927. All the charities in or available for London are classified here in a manner convenient for reference, and, excluding missionary and religious institutions, the turnover enumerated in the register amounted for the year 1924–25 to £14,965,307. This is a slightly less figure than marked the previous year, and no estimate for the later 12 months is forthcoming, but there is certainly a vast sum at issue. The voluntary contributions included in this sum amounted to £6,192,883, while legacies accounted for £1,387,166, a fluctuating source of income designed in many cases to continue, by way of interest, the contribution of a dead supporter. It should be noted that the number of the charities deriving their income from purely metropolitan sources, and expending it solely upon metropolitan cases, is comparatively small, but the number which, while located in the metropolis, derive their income from all parts of the kingdom, or afford assistance to applicants from all parts, is very large. Both as a summary to the volume of charity and as a classified list of the institutions dispensing it, the book is a valuable one, while a full index makes reference easy. The compilers are to be congratulated on their labours.

HEALTH CONDITIONS IN BRUNEI.

This State is situated between British North Borneo and Sarawak, and is 770 nautical miles distant from Singapore. It consists of an area of about 2500 square miles containing a population of some 27,000. In 1885 the Sultan agreed that Great Britain should control his foreign relations and in 1905, under a further agreement a British Resident was appointed to advise and assist in the administration of the State. Mr. E. E. F. Pretty, the present Resident, has just furnished to the Colonial Office his report for the year 1925. In the Medical Section it is stated that the general death-rate was lower than in the previous year, though the infantile mortality stood at 314·2 per mille as against 303·9 in 1924. The ratio of births to infantile deaths was 3·18 to 1. The general death-rate of 30·68 per mille showed a great improvement on the 1924 figures, and contrasted very favourably with the Labuan rate of 36·35 for 1925. All these figures tend to show that there must be a good general average of fair health amongst the inhabitants, and apparently the principal disease is malaria. Beyond a few cases of mumps and chicken-pox, no contagious diseases. There were 1285 vaccinations in Brunei and the out-stations, as against 1026 in 1924, and these figures, contrasted with 993 births in 1925 and 1099 in 1924, tend to show that the younger generation should be well protected against small-pox. Dr. H. W. Furnivall, medical officer of Labuan, acted as medical officer of Brunei throughout the year, and paid in all 18 visits. Sixty-four cases from Brunei territory were treated in Labuan Hospital. A total of 2748 were treated in the Brunei Government Dispensary and out-stations, as against 2520 in 1924; most of these cases were among Government servants, police, and prisoners, and the nature of the diseases was chiefly of a trivial character. The following is a comparative table of the principal diseases treated in 1924 and 1925:—

	1924.	1925.
Malaria	.. 215	204
Diarrhœa ..	.. 64	78
Constipation ..	.. 118	146
Bronchitis.. ..	.. 89	110
Round worms ..	.. 50	70

There were 37 Europeans resident on the average in the State, and they enjoyed good health, though malaria claimed some victims in the out-stations. One European child was born during the year. 1925 was remarkable for its phenomenal rainfall, a maximum of 12 inches in the 24 hours, and a total of 213 inches for the year being recorded on Labu estate. In Brunei town it rained on 226 days out of the 365.

DEATHS AMONG SWEDISH SEAMEN.

IN *World's Health* for April Prof. H. Davide, of Stockholm, gives a classified list of deaths among Swedish seamen for each of the ten years 1911–1920. There were in all 6259 deaths; the number was greatly increased in 1918 by the influenza epidemic, which seems to have raised the deaths from "other infections" by 300, and those from pneumonia by 35, but to have left the deaths from tuberculosis unaffected. Of all deaths one-quarter were due to accidents, as compared with one-half in the British merchant marine (and one-twelfth among men of seafaring ages in the general British population). Of the Swedish deaths 15 per cent. (British 2¼) are ascribed to tubercle, but 4 per cent., as in England, to pneumonia. In Sweden 4 per cent. are ascribed to malignant disease, but many less in England where, perhaps, men sooner cease to go to sea.

Before joining a Swedish ship a sailor must be declared to have no disease unfitting him for service at sea; further, if he is going abroad he must not suffer from venereal disease in an infectious stage. His diet is prescribed by law, as is also his accommodation on board (120 cubic and 15 square feet). During any period of 48 hours he must not work more than 24 if he is a sailor, more than 18 if an officer, more than 16 in the engine room. A medicine chest as prescribed must be provided, and the captain must give his men the treatment they need and send them to hospital if necessary. Venereal disease in Sweden is treated at the expense of the State, which also provides treatment for seamen patients when they are abroad.

Although there is no statement of the total numbers of seamen among whom the deaths occurred, and no attempt to elicit death-rates, the figures afford valuable information for comparison.

DONATIONS AND BEQUESTS.—Among other bequests the late Miss Alice Fothergill, of Carlton-hill, St. John's Wood, left £1000 each to the London Hospital, Dr. Barnardo's Homes, and the Hospital for Sick Children, Great Ormond-street, and £500 to their convalescent branch; £500 each to the National Society for the Prevention of Cruelty to Children, the Metropolitan Convalescent Institution, the Royal Blind Pension Society, the London Society for Teaching the Blind, Sir William Treloar's Cripples' Home, and the Home for the Aged Poor, Ealing.—Mr. Samuel M. Adams, of Bassett House, Wellingborough, left £800 to Manfield Orthopædic Hospital, £250 each to Wellingborough Cottage Hospital and Kettering Hospital, and after other legacies and bequests, the residue of the property to Northampton General Hospital.—Mr. Francis George Hoyle, of Armley, Leeds, left certain bequests to the poor of Armley, £500 to the Leeds General Infirmary, and £250 each to the Leeds Women's and Children's Hospital, the Leeds Tradesmen's Benevolent Institution, the Leeds Unmarried Women's Benevolent Institution, Sir Arthur Pearson's Hostel for Blinded Soldiers, and the Leeds Dispensary, and £100 to the Armley Nursing Association.—Mrs. Mary Amelia Gratrix, of West Point, Whalley Range, Manchester, who left £49,280, gave £250 to the Northern Counties Hospital for Incurables, and the residue of the property, after certain bequests, to her husband for life, and then to the Manchester Royal Infirmary, the Missions to Seamen, and the Manchester and Salford Branch of the National Lifeboat Institution.—An anonymous donor has sent to the Lord Mayor of Liverpool a cheque for £4000 to the Royal Liverpool Seamen's Orphanage. A short time ago Mr. William Reed left to the Orphanage £72,000, which sum was reduced by death duties to nearly £50,000.

[1] The Annual Charities Register and Digest, 1927. Published for the Charity Organisation Society by Longmans, Green and Co., Ltd., 39, Paternoster-row, E.C. 550 pp. 8*s*. 6*d*.